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WORTHWHILE JUNIOR TRAINING

On August 9th the Capital Rifle Club of Hartford, Conn. conducted a smallbore rifle tournament on the Blue Trail Range in Wallingford for the principal purpose of initiating some of their junior club members into the work of tournament operation, under supervision of experienced adult workers. A secondary purpose was to provide some competition during the National Matches period when no other local activity was programmed. Experienced tournament workers of the Conn. Rifle and Revolver Ass'n cooperated with the Capital Club members in this project and match.

In spite of a heavy rain the morning of the match, 31 competitors showed up and fired the four 40 shot matches. Expert Don Bush from Torrington won the aggregate with 1561-71 and Al Mason from New Haven was second with 1560-80. Poor shooting conditions, especially for the last match of the day when wind conditions were reported the worst ever experienced during a match on that range, show up in the low scores.

The tournament was considered successful in its main purpose; giving the juniors some on-the-job training in match operation. While this phase of training Junior club members is not entirely new, since Junior Clubs have operated matches for senior shooters (under adult supervision) in other states, it does seem a worthwhile project for adoption by other clubs and state associations.

PHT

A BIT OF THE NATIONAL MATCHES

Spending seven days at Camp Perry, visiting and observing, as I did, is doing just "a bit of the National Rifle and Pistol Matches" as that big shooting event is today. I arrived at Perry Aug. 3rd, with the .22 cal. matches of the National Pistol Championships under way, and left Aug. 10th, as the last half (any sight matches) of the National Smallbore Rifle Championships got under way.

The pistol range at Perry this year was really something to see—500 targets in one line, divided into five separate ranges of 100 targets each with a safety zone of some 50 yards between each range in order that each range might operate independently, each range having its own chief range officer and staff of assistant range officers and target detail. And with that 500 targets it was necessary to have four relays in all the individual matches. Approximately 70% of the pistol entry was from the armed services, both regular and reserve, 20% civilians and 10% police. No doubt the government travel allowance for civilian pistol teams was responsible for the civilians outnumbering the police, two to one.

Army's M/Sgt. Huelet L. Benner is the 1959 National Pistol Champion, firing a 2615-84 aggregate score. Marine Capt. William McMillan was on Benner's heels with his 2614-129 score. Lt. David Cartes, USA, was third with 2610-95; M/Sgt. Richard Stineman, USA, fourth with 2606; James E. Clark, Shreveport, La., 1958 National Champ, was fifth and high civilian with 2602-106; and John W. Hurst, Detroit Police, was sixth and high police shooter with 2600-105. I may be wrong in thinking this may be a record number of 2600 scores in a National Championship competition. George Phillips from New York was second high civilian with 2573 and ex-Navy shooter Offutt Pinion was third with 2567.

John W. Hurst, Detroit Police, won the .22 cal. aggregate with 879-42 over Army's Sgt. Santiago Machuca's 879-35. U. S. Border Patrol's John C. Forman was third with 877-40 and USAF T/Sgt. John L. Keyser fourth with 877-32. James Clark was high civilian and 8th overall with 872-39.

Presley O'Gren, U. S. Border Patrol, won the center fire aggregate with 875-36. McMillan was 2nd with 874-44 and Benner 3rd with 874-27. Charles Rogler was high civilian with 865-27 and Offutt Pinion 2nd with 865-24.

The .45 cal. aggregate bulletins were all gone when I picked up pistol bulletins but I think McMillan won; at least he picked up two of the three points he was behind Benner at the start of that day's shooting.

S/Sgt. James H. McNally, USA, won the Individual National Trophy Match (.45 cal. Service pistol) with a 293. P. O. Gasper P. De Fino, USN, was 2nd with 290 and Sgt. Lowell T. Cassidy, USMC, 3rd with another 290.

The Marine Corps team of Sgt. Robert O. Jones (291), Capt. Wm. McMillan (287), Sgt. Robert E. Harrington (275) and Sgt. Donice R. Bartlett (274) won the National Trophy Team Match with 1127. Army No. 2 was 2nd with 1122 and All Army team 3rd with 1119.

Following the National Trophy pistol match firing, there was an over-night transformation from a 500 target pistol range to a complete smallbore and muzzle loader rifle range; with a 50 meter free rifle range on the extreme west end, next to the Erie Proving Ground, then a 314 target smallbore range for National Championship matches, then a safety gap and a generous bank of smallbore practice targets, and at the east end, on what used to be old "A" range, the muzzle loader range was set up.

The first day of the smallbore championship matches (metallic sights) was cloudy dark with fish-tailing wind and a lot of competitors were right unhappy with their scores, but the second day with the irons was better and scores improved. Since I left Perry the following day I did not get any detailed score dope but I know that Army's Lt. Presley Kendall won the metallic sight aggregate with a good score. I have heard, unofficially, that young Marine Cpl. Walter Kamila won the National Championship.

Total entry in the smallbore rifle matches was reported to be somewhat larger than in very recent years, considerably over 600, predominately civilian competitors but with a good representation from the Armed Services as well.

The muzzle loader shooters appeared to be having a lot of fun and making plenty of smoke Saturday and Sunday. Most of that competitive shooting was at 50 and 100 yards but there were a few targets at 200 yards for shooting the fine old "slug rifles" from rest. There was a North-South Skirmish on Sunday with some twenty uniformed teams (military

The long smallbore range at Camp Perry, 1959, with 314 targets to handle the more than 600 competitors in two relays.

COMING MATCHES

(We will list place, date, type and title of match, name of sponsoring organization, name and address of contact person, at a nominal flat rate of $2.00 per insertion, prepaid with insertion order. Insertion orders must reach the Precision SHOOTING office, 64 Depot Street, Lyndonville, Vt., at least 45 days before date of match for single insertion orders. For multiple insertions, 30 days additional must be allowed for each additional insertion desired.)

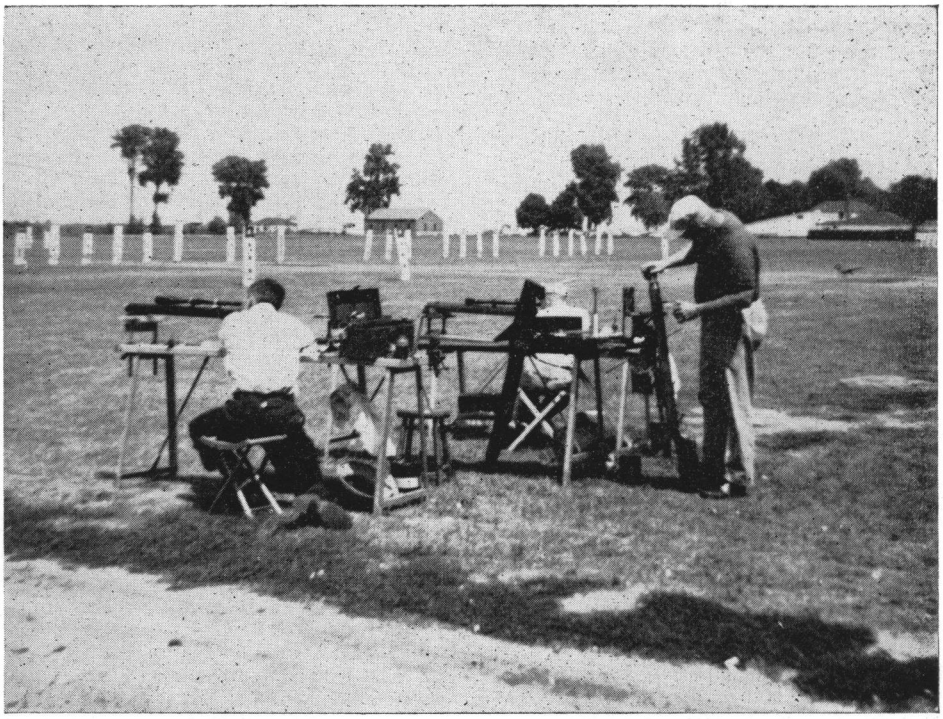
ALBANY, NEW YORK: September 27; Forbes Rifle and Pistol Club Seventeenth Annual Smallbore Tournament; Donald Winne, 20 Frederick Avenue, Albany 5, New York.

units) and quite a number of accompanying ladies in costumes of Civil War days. This program was begun with a parade of the uniformed units, led by a fife and drum corps in uniform, down the main camp street to the range, and this was a colorful spectacle. Both the parade and the shooting attracted a large gallery of interested spectators. This is the first time I have ever seen one of these competitions and I thoroughly enjoyed myself as a spectator. On most of the teams that I was able to closely observe, it appeared that one or two of the team members did most of the hitting while the other members gave mainly supporting fire and close misses.

As usual, Commercial Row was an important feature of the Matches for the average shooter, both for seeing what is what in shooting equipment and accessories and the center for meeting old and new friends. Sooner or later you see just about everyone at Perry on "The Row" or on the promenade of the Arcade Building.

With the various types of competition following each other during the National Match program, there is considerable changing of exhibitors on Commercial Row. Some of the manufacturers and dealers who cater chiefly to rifle shooters did not arrive and open shop until the pistol matches were about over, while the handgun manufacturers representatives pulled out immediately after the conclusion of the pistol shooting. However, most of the principal manufacturers of arms, ammo and accessories, and several of the dealers, including Freeland's Scope Stands, Inc., Friddel, Hogue's Gun Shop, P. J. O'Hare and Evaluator's Ltd. were open for the duration.

One new item of interest which was being demonstrated on The Row was an electrically operated, automatic reloading machine for pistol cartridges, which is being manufactured by AUTOLOAD, Inc., 683 E. Young St., Santa Ana, Calif. The machine, with a claimed maximum output of 5000 reloads per hour, puts pistol cartridge reloading on a real production basis. Each cycle of the machine delivers one reloaded cartridge. Empty fired cases, primers, powder charge and bullets are fed to their proper places automatically. There are eight separate stages in the reloading cycle, all being performed at each cycle of the machine. The empty fired case is automatically fed to the machine in the first stage. Second stage is an inspection station which detects any foreign matter in the empty case, such as scraps of paper, cigarette butt or such like, and the machine is automatically stopped if there is such. At the third stage the case is sized and de-capped. The fresh primer is seated at the fourth stage. The measured powder charge is dropped in the case at the fifth stage. The sixth stage is another inspection station where any sizable over or under powder charge is detected and the machine automatically stopped. The bullet is seated in the seventh stage and the loaded case gets a final sizing at the eighth stage and the loaded cartridge is expelled into a bin on the next cycle of the machine.

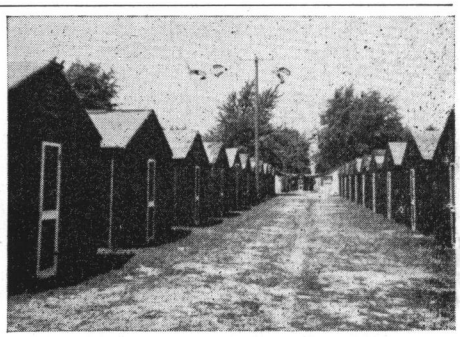


Rest shooting at 200 yards with heavy muzzle loader "slug rifles" at Camp Perry, 1959.

Naturally, the machine is no more than an item of interest to the individual shooter, but its production capacity should make it a worthwhile investment for the larger police departments that use large quantities of reloaded ammunition in their marksmanship training programs. I would rather doubt, however, that the competitive shooters in such police departments would choose reloads from this machine for use in their match shooting. Cost of the machine is nearly $2500.

Personally observing the age range of Camp Perry competitors, from many boys and girls in their teens to old timers well into their seventy's, the friendliness and ever ready extension of a helping hand when needed, certainly gives one confidence in the future of shooting as both a competitive and recreational sport. Frank Kahrs, former Remington shooting promotion head who has yet to miss a Camp Perry meeting, was in camp for a few days of visiting. Chris Westergaard from Whiting, Iowa, with more than fifty years of competitive shooting behind him, was on deck and shooting. A. C. Berg from Loraine, Ohio, was boasting that he thought he was the oldest smallbore competitor on the firing line—he is 75 years old. But the smallbore matches had plenty of folks who qualified as "Senior Competitors" (age 60 and over). Youth, however, with its stamina for the long grind of the present Smallbore Championship course, was making its mark against the years of experience of many of the more mature competitors.

Meals at the Competitors' Mess were both satisfying and inexpensive. The huts for competitor housing are not improving much with age, but a crew was making some repairs to the buildings (new roofs, doors, etc.) while the matches were in progress. Family attendance at the Matches seems to be increasing and a section of the hut area between the mess hall and Commercial Row was alloted to women and families, in addition to the old Squaw Camp of earlier years.



A street in the civilian hutment area at Camp Perry, 1959.

The week at Camp Perry was most enjoyable and satisfying and my only regret was that I couldn't stay longer. I made many new acquaintances and renewed many old ones, learned new "kinks" and absorbed a lot of shooting information. In some cases, I think, I was able to pass along bits of information other people wanted. I have always believed that a most important feature of national shooting meetings is the mingling and getting acquainted of people with a common interest from all sections of the country, and that this is especially true of the National Rifle and Pistol Matches where so many shooters gather. I can't imagine anyone with an interest in shooting who doesn't gain something worthwhile from attendance at the Camp Perry gathering, even if only observing and visiting, as I was this year. Those who can attend as participating shooters, and attend the shooting schools for the weapons of their choice, are even greater gainers.

PHT

WE DON'T GET "FIRSTS" on every new development, but we do "smell" some interesting items—and go after the dope on them.

THE COVER PHOTO

Camp Perry's "Commercial Row" where a majority of the manufacturers and dealers had their wares on display and for sale. Winchester-Western and Evaluators Ltd. were located in similar buildings to the right of this row and some of the smaller firms, including Hutching's Gun Stocks, Ruger Pistols, Mitchell's Shooting Glasses and others were in the small huts immediately behind (right) of the buildings on The Row. Lyman Gunsight, P. J. O'Hare and Blackington were located in the Arcade Building (insert on cover) which also houses the NRA and DCM offices, PX, post office, and some local firms catering to the competitors, barber shop, etc.

DYNAMICS OF THE BOLT ACTION RIFLE

By Jesse M. Grigg

WHEN a propellant is burned in a rifle barrel the separate energies imparted to bullet and rifle are inversely as the respective masses. As the mass of the bullet is negligible compared with that of the rifle, the kinetic energy of the bullet may be hundreds of foot-pounds and that of the rifle small enough to be easily absorbed by the shoulder.

If the backward thrust acts on any part which is capable of movement independently of the whole, this part, while moving independently, receives energy in amount proportional inversely to its own particular mass. Later, when its motion is arrested by collision with another part, its kinetic energy is shared with the second part in accordance with the laws of momentum. Thus the resultant motion of the rifle as a whole, and in turn the point of bullet impact, depend on the amount of play between certain parts, and the relative masses involved.

If one part capable of independent longitudinal motion is the cartridge case its rate of receiving energy is tremendous; but, as its freedom of motion is limited and the velocity is high, the time is so short that the gross effect on the point of impact may be relatively small. On the other hand if the whole metal assembly slides in the stock groove, the time involved is bore time, or nearly so, and the effect on the point of bullet impact is tremendous because the masses of the barrel and stock are commensurable.

If the design is such that the metal assembly "creeps" backward at the start of firing and recedes to its original position at conclusion, this rifle will need the so-called "foulers and warmers" before it settles down to one zero, and it may return to the starting zero in between if the interval between successive shots is too long. From this it is plain that the very first requirement for consistency is a firm anchorage of the metal assembly at some place in the stock groove.

The creep which occasions the need of foulers and warmers is due largely to inherent fault in the recoil lug and shoulder whose function it is to prevent the occurrence. The fault is inherent in the design because blocking in one direction only is provided. You cannot push one body against another and expect the two to remain in firm contact after the pressure has been removed. To anchor the assembly requires positive, simultaneous blocking on both sides of the lug, as is obtained by wedging into a recess in the wood, or by a double eared lug such as is illustrated in Fig 3; and even these are ineffective unless the lug itself, or whatever serves for it, is immovably fixed to the barrel or receiver. In what follows a lug which opposes movement in one direction only is called a "one-way" lug. One which opposes motion in both directions is called a "two-way."

The dynamics of a shoulder arm are further complicated because the motion in recoil is never straight back. The center of gravity and the resistance of the shoulder both lie below the line in which the thrust is exerted. The rifle moves backward and upward about an equivalent pivot which lies somewhere below the bore axis. Meanwhile, because the thrust comes suddenly and the inertia is considerable, the unsupported muzzle tends to stay where it was. Whether it does this or rises and falls depends on various characteristics; but in any case the throw puts in the rifle a series of curves which theoretically envelop it from muzzle to buttplate.

A radius of curvature measured to the bore center from a point below is greater than a radius measured to a corresponding place in the stock. The length of an arc is always proportional to its radius. Thus, inside the stock groove, a point on the wood surface moves less in bending than does a point on the adjacent metal surface; which is to say that metal and wood, at every place excepting where they are fixed together at the recoil lug, move relatively to each other, just as do the inside surfaces when two boards are laid together and bent. With both bending and sliding involved, both friction and interference with motion are involved wherever the surfaces are in contact. Collectively, they constitute one of the most difficult of problems which confront the designer.

The typical shapes of the curves in the bended barrel are easily simulated with an ordinary folding rule as is denoted in Figs. 1 and 2. The rule is opened to 30 inches and supported over a table at points 1, 2 ,and 6 by any suitable objects such as two pencils and a match box. Places 1 and 2 correspond respectively to those of rearward and forward receiver screws, and 3 corresponds either to a bedder, a barrel band, or else the place where the forestock pushes against the under side of the barrel. (If the barrel is full floating 3 of course is absent). The arrows correspond to finger pressure where the rule tends to rise above the supporting object.

The Fig. 1 curve is simulated by placing a match box at 3, pencils at 2 and 1, and finger pressure at 2 so that a prolonged straight line through 3 and 2 would fall below the level of 1. Depressing the end M of the rule with the other hand causes the additional bending denoted by the broken lines, this corresponding to bending during the cycle of firing. Note that down pressure at M causes change of curvature in every section of the rule, even between 2 and 1, and further that forcible change of curvature in any section changes curvature all along the line. The corollary is this: Excepting at the key places of support, the stock should clear the metal assembly, else interference with the natural motion may lead to irregular performance.

The curve shown in Fig. 2 is had by placing a match box at 2, pencils at 1 and 3, and finger pressure at 1 and 3 so that a straight line prolonged through 3 and 2 runs above the level of 1, instead of below. As the rule pushes upward at 3, this upward pressure in the rifle itself is restrained by a barrel band or a bedder point.

The reactions in the Fig. 2 curve differ from those of the Fig. 1 in ways which are described as follows. In Fig. 1 an increase of pressure at M diminishes the curvature between 3 and 2, this causing a longitudinal force to be exerted in the forward direction at 3 and in the backward at 2. In the rifle itself this backward thrust at 2 tends toward firmer seating in the case of a one-way recoil lug, and this is an advantage. In the Fig. 2 case pressure at M increases the curvature between 3 and 2, this tending to pull a one-way recoil lug off its seat. As this could not happen in the case of a two-way lug, it appears that this is one of the ways in which the Fig. 1 curve is preferable.

In the rifle itself the undesirable Fig. 2 curve is distinguished by fact that backing off the rear receiver screw permits the rear end of the receiver to rise. A movement of only a few thousandths may be felt by placing the finger so that it touches wood and metal simultaneously. Depending on the design, the direction of curvature may be reversed, that is to say the Fig. 1 curve may be obtained by inserting a suitable shim at 1; by jacking up the barrel at 3 with a bedder; by simultaneous resort to shim and bedder; or, if the rifle has no bedder, an upward pressure on the underside of the barrel at 3 may be provided by a shim.

The Fig. 1 curve is inherent in a design which calls for a semi-floating barrel; that is to say, calls for upward pressure at the forend tip without the use of a barrel band. If upward pressure is absent it may be obtained by one of the methods just described, and it must be obtained in the class of rifles which secure the metal assembly to the stock by means of a single screw.

For several reasons point 2 is the favored place for the recoil lug. In high power rifles the locking lugs are likely to be at the forward end of the bolt to keep the stress off the slender sides of the receiver, and for the same reason the recoil lug is there too. In .22 rimfire rifles the locking lugs may be at either end of the bolt, but point 2 is still the favored place for the recoil lug, perhaps for the only reasons that the bedding system is more easily adapted to this position and to the untoward effects of a widely changing range of temperatures.

In high power rifles there are two, and sometimes three, receiver screws. The recoil lug is a wide, transverse flange bedded down into the wood for anchorage. Some .22 rimfire rifles, notable in the less expensive class, use only one receiver screw, this at the forward end of the receiver, and surrounded by a snugly fitting metal sleeve which serves for recoil lug. The homemade recoil lug in this writer's 52-C is illustrated in Fig. 3. The ears at either end prevent the lug itself from moving longitudinally. The cross rib, which fits into a corresponding slot in the receiver, precludes motion of the receiver also in the longitudinal direction. The concave surface fits the round of the receiver so that the metal assembly is held without cant and without need of contact with the adjacent wood in the stock groove.

If the metal assembly of a .22 match rifle is properly anchored at 2, and clearances for bending have been provided, and also if the metal assembly is free of untoward internal strain, then the only dynamic characteristics which regulate the accuracy are sliding friction at points 1 and 3. Variation of this friction will vary the point of bullet impact owing to variation of the bending. If at point 3 the friction is inherently low as it is in the metal to metal contacts of a point

bedder, it is possible that the bedder adjustment will not be critical, as is borne out by some of the tables in "Bedders," by L. F. Moore, June 1954, SHOOTER'S NEWS. This is far from saying, however, that the bedder is unnecessary. Even if not adjusted for a minimum of sliding, it permits the barrel to be unmistakably supported in its natural position, free of strain excepting that associated with normal sag—which would be about .010" at the muzzle of a full floating heavy barrel.

This much for a theory which is simple compared with the difficulties of making it work. To begin with, we know without doubt that the screw at the recoil lug must be pulled very tight. With respect to the other receiver screw we are in somewhat of a dilemma.

In outdoor shooting temperature change sets up longitudinal stresses which, if the receiver is secured only at the recoil lug, cause its length to vary as does the length of a steel bridge. The heat force which causes this is said to equal the mechanical force that would be needed to deform the metal the same amount. If only one screw is tight possibly the rifle will not group. If both are tight the metal may be subjected to terrific strain. This is enough that once, on a very warm day, this writer heard a pent-up friction strain break away with a pop which sounded like the parting of a machine bolt.

What is needed at 1 is a fastening that could yield in the longitudinal direction while resisting fully in the vertical; in fact a fastening such as a combination of ball bearing and binding screw might provide. Neoprene pads yield to longitudinal stresses, but have proved unsatisfactory after heating has softened them and caused sticking to the metal surfaces.

The ideal, and perhaps unattainable, solution no doubt would be the use of receiver and stock materials having equal coefficients of heat expansion. Next to this perhaps is a low coefficient of friction between the sliding surfaces.

Metal on wood is a poor combination for the purpose here. The coefficient of friction between these substances is quite high, as was long ago evinced in the use of wooden brakeshoes to press against the steel wheels of railroad handcars, and the iron tires of wagon wheels. To circumvent in some degree the sticking together of surfaces in the rifle assembly this writer has used for some years a metal to metal contact, formed by inserting a shim of thin sheet metal about ½" x 5/8" and drilled for the receiver screw to pass through. Being thin, it readily forms to a fit. Either shellac on the under side, or a boss formed with a center punch keeps it from sliding. Whether or not it has helped, no adverse effect has been noted.

The same purpose possibly may be served as well by a product called plastic steel which is now sold in hardware stores. Certainly. it is admirable for providing hard surfaced point bearings at the places of support.

As there is no variable temperature problem indoors both screws may be pulled very tight for gallery shooting. Outdoors in summer sun two tight screws may cause trouble. However, if the rifle has a bedder or a barrel band which secures the barrel to the forestock it is likely to give a good account of itself with the rear receiver screw backed off a little. The virtue of a loose screw is borne out by fact that many rifles are designed to shoot with only one receiver screw, even without bedder or barrel

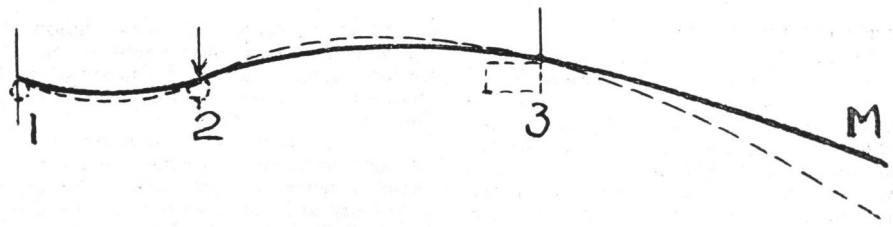


FIG. 1

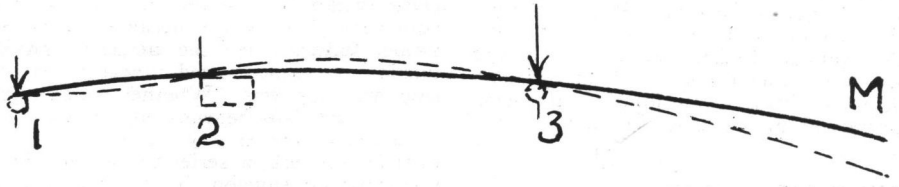


FIG. 2

band at 3. The Model A 52 has only a wood screw at point 1, but at 3 a tight band, and reportedly it shot well with the rear screw loose. Recently one of this model was observed to shoot a 400, and is a rifle that had a pipe stem barrel, and appeared like a collector's item.

However, when the screw at point 1 is backed off, more than mere looseness is involved. According to Figs. 1 and 2, the receiver end at point 1 tends to move down as the muzzle dips down in firing. If the receiver end does not touch the stock all is well; but if it touches one time and not the next, the performance will be erratic.

To avoid this condition the stock should normally push up at point 1 enough to insure unfailing contact; and, instead of wood, a hard, non-resilient, low friction contact surface would be ideal. Then if the screw is backed off, it should be backed off at least one-quarter turn in order to permit sliding. But, whether the screw is worked tight or loose, if an occasional low or high shot is thrown, either the "loose" screw is still too tight, or the "tight" screw is not tight enough.

In cases where the barrel is secured to the forestock with a band, or else merely bears down in the forestock under its own weight, the state of initial relations at the rear end of the receiver are easily determined. If the stock pushes up at the receiver end as it should, the receiver will tend to rise at its forward end when the forward receiver screw is backed off a trifle for test. On the other hand, if the rifle has a point electric bedder the difficulties of determining the state at the rear screw are compound because vertical adjustment of the bedder moves the receiver end up or down if it is free to move. It is suggested therefore that the rear screw be pulled tight once for all, leaving the bedder to be adjusted in the usual manner for best grouping. All that the bedder does, excepting the very important elimination of side strain, is to fix the elevation so that the barrel bends with a minimum of sliding over the bedder points.

If the barrel is full floating, that is to say, does not touch wood in the stock groove, even at time of firing, the action must have at least two receiver screws, and both should always be very tight when the rifle is fired. If expansion causes trouble under a hot summer sun, the strain may be relieved by momentarily loosening and again tightening the screw at the rear end of the receiver.

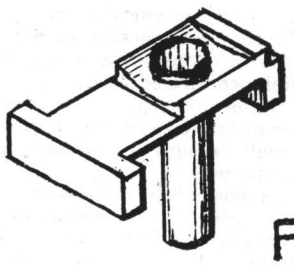


FIG. 3

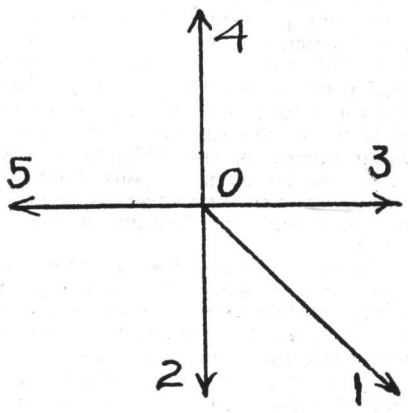


FIG. 4

All this on the behavior of a rifle is predicated on the writer's inexorable belief that the motion of a barrel while the bullet is in the bore is whip, not vibration. Vibration is the to and fro motion which for example occurs when one end of a flat spring is clamped in a vise, and the other is pulled to one side and released. During the course of angular throw the axis of a rifle barrel is bent in one direction, but the force which does this bending does not abate until the bullet is gone. Because the stress is still on during this interval the barrel cannot swing back as it would need to do in order to vibrate, and it may vibrate after the stress abates only if the places of attachment to it chance to fall at natural nodes.

Five years ago, using actual weights and dimensions, I performed the Herculean task of calculating with differential equations the motion of the muzzle of a 52-C rifle assumed to have its barrel bedded full floating in the factory stock (the difficulties for the three-point support are insuperable). Determined were the angle turned through by a tangent to the bore axis at the breech, and the mo-

(Continued on Page Fourteen)

THE TOURNAMENT CIRCUIT

THE 1959 REDFIELD MATCH

George Stidworthy, Jr., the Prescott, Arizona hot-shot, topped the Grand Aggregate with the high score of 3196-237 for the 15th annual Redfield Smallbore Match, sponsored by the Redfield Gun Sight Company in cooperation with the Colorado Rifle Club and fired on the club's range near Denver, Colorado, August 1 and 2. Following Stidworthy in aggregate ranking were Herb Hollister, Boulder, Colo. 3191-245; Bill Atkinson, Prescott, Ariz. 3191-216; Elinor Bell, Santa Monica, Calif. 3191-199; Clyde Reedy, Boulder, Colo. 3190-239; and Ray Steele, Denver; C. L. Bender, Prescott, Ariz.; Wm. J. Grater, Oxnard, Calif.; Floyd P. Archer, Jr., Homestead, Fla.; Maurice McFaddin, Custer. S, D.

Harvey Enos, Albuquerque, N. M. headed the Expert class with a 3181-204, and Jim Lancaster, the 14 year old Junior from Long Beach, Calif., led the Sharpshooter class with a neat 3177-173.

Stidworthy was high in the iron sight aggregate with 1598-121, and Herb Hollister took the any sights aggregate with 1599-129. Hollister and Reedy won the two man team match with a possible 800-64.

There was a capacity entry of 66 shooters from 15 states and some 15 late entries had to be returned. Shooters ranged from young Jim Lancaster to the other extreme of "youth," Mr. and Mrs. Lewis Osborn of Santa Rita, N. M. who are well past the three-score mark, and from top rank tournament competitors to beginners in tournament competition.

Weather for the first match, at 50 yards, was about perfect for iron sights and was won by Homer Tohill, Calif., with 400-33. The tricky Colo. Rifle Club range weather, including untruthful breezes, took over for the 50 meter iron sight match, but Stidworthy managed to produce a clean 400-35 to win, the only possible for the match. Walter Clark, Colo., won the iron sight Dewar with 400 26, again the only possible of the match. Bill Atkinson nursed his 40 shots into a 400-20 score to win the 100 yard iron sight match.

On the second day, all matches with any sights, Ray Steele won the first match, 50 yards, with a 400-37, which topped 16 other possibles. Hollister won the 50 meter match with a 400-36, followed by 4 more possibles; the breezes were waking up. Lowell Higgins, Colo., won the Dewar match with 400-33 to beat 7 other 400's. Clyde Reedy topped 5 other possibles with his 400-30 to win the final match at 100 yards.

Match 14, the party at the Watt Redfield farm, again proved the most popular of all, thanks to the skill and hospitality of Mrs. Redfield.

George Stidworthy (left) of Prescott, Arizona receives his championship award from Watt Redfield of the Redfield Gun Sight Company. Stidworthy fired a grand aggregate 3196-237 to win first place in the 15th Annual Redfield Smallbore Rifle Matches August 1 and 2 at Denver, Colorado.

The Colorado Rifle Club range near Denver where the Annual Redfield Smallbore Rifle Match is fired.

FORBES LONG RANGE MATCH

A mixed field of top-notch Service and Civilian shooters fired the Forbes Rifle and Pistol Club's sixth annual Long Range Tournament, consisting of six 20 shot 1000 yard matches, at Karner Range, Town of Colonie, Albany County, New York on July 25th and 26th. Clear weather with the temperature in the 70's and humidity in the 50's was conducive to good scores but the heavy shimmering mirage and a gusty, puffy 10 to 11 o'clock wind varying from 3 to 30 m.p.h. bothered some of the best of them and ruined potentially fine scores.

Captains S. R. Hinds of Ft. Mead and R. J. Rucker of Ft. Monmouth fired the only possibles with 10 and 7 V's respectively. Creighton Audette of Springfield, Vermont, 1000 yard New York State record holder and money winner in every long range tournament fired at Karner since 1939, out-Veed all with a 99-13V. Kay Keel Wakeman of Gloversville, N. Y., the only woman competitor, after using ten shots and nearly half her time to get on target, turned in a very respectable 99-8V, one of the highest 1000 yard scores fired in the Northeast by a girl.

High power facilities at Karner now include twelve targets on 8′ 1″ centers. Very few cross fires attributable to wind have been experienced since the "bobtail" C targets have been authorized. The great majority of badly zeroed rifles have been out for elevation errors. On the basis of Forbe's experience it seems conclusively demonstrated that the advantages of increased range capacity, faster marking and reduced storage requirements made possible by use of 6′ X 6′ C targets, coupled with the practical fact that a 1000 yard score down three points for one shot will seldom win a match, greatly outweigh the disadvantages and that the decision of the NRA to authorize the use of such targets was a sound one.

A few shooters used ammunition which produced no audible sound wave at the target. All such ammo produced extreme vertical dispersion and compounded its users' windage troubles by making their shot holes hard to find and their pit service slow. Which seems to demonstrate: a) That the long range shooters from the days of the Irish-American International Matches to and including K. K. K. V. Casey were better than their scores indicated, and (b) That it is not smart to send a boy to do a man's work.

Winning and outstanding scores

were: **Match 1,** Service Rifle, issue sights—1st, Garry Stekeur, Latham, N. Y., 97-8V's. **Match 2,** Any Military Rifle, issue sights—1st Capt. S. R. Hinds 95-6V's. **Match 3,** NRA Rifle, iron sights—1st, Creighton Audette 99-12V's, 2nd, Capt. Hinds 97-9V's. **Match 4,** Any Rifle, iron sights—1st, Baxter L. Bright, Tonawanda, N. Y. 99-11V's, 2nd, Sp/4 W. D. Jordan, Ft. Mead, 99-11V's.

Match 5, Any Rifle, any sights—1st, Audette 99-13V's, 2nd A. E. Englund, Lynchburg, Va. 99-10V's, 3rd John Smith, Ft. Mead, 99-10V's. **Match 6,** Free Rifle, any sights—Capt. Hinds 100-10V; Capt. Rucker 100-7V; Baxter Bright 99-10V; Stekeur 99 9V, Kay Wakeman 99-8V; D, M. Conklin, Scarsdale, N. Y. 99 11V; and 1st Lt. K. M. Irish, Ft. Mead, 98-11V.

Match 7, Iron sight aggregate—1st Lt. A. Wilder, Ft. Mead, 376-27V's; Sp/4 Jordan 375-27V's; Garry Stekeur 374-27V's. **Match 8,** Any sight aggregate—Creighton Audette 195-24V's; Baxter Bright 195-21V's; Capt. Hinds 195-18V's. **Match 9,** Grand Aggregate—Lt. Wilder 568 42V's, Sp/4 Jordan 567-46V's.

D. C. Reilly

VERMONT STATE PISTOL CHAMPIONSHIPS

The Vermont State Open Pistol Championship tournament, sponsored by the Woodstock Rifle and Pistol Club and fired at South Woodstock, July 18-19, had a range capactiy 60 competitors in the .22 cal. matches and two quite well filled relays in the .45 cal. and Center Fire matches.

Massachusetts State Police shooters took the three top places in the three gun aggregate, Julian Zuk with 2542, Robert Bolduc 2533 and Donald Bowles 2519. H. E. Cole, East Orange, N. J. was fourth with 2515. High Expert was Constance Rollins, Hancock, N. H., 2433, and high Sharpshooter, John Rollins with 2368.

Zuk won the .45 cal. agg. with 847, Bolduc 2nd with 844. Zuk also won the .22 cal. agg. with 861, Cole taking runner-up spot with 853. Cole took the Center Fire agg. with his 849.

CONNECTICUT BIG BORE RIFLE LEAGUE

The July 19th match of the Connecticut Big Bore Rifle League on the Blue Trail Range in Wallingford had 367 individuals shooting on 39 teams. The high scoring Rippowam Rifle Club had three women helping make its team score of 611-57V. D. Buchalter was high with 124 8, M. Ventres 2nd with 123-12V and V. Williams 5th with 121-12V, and each of the three shot a 49 offhand for the 10 shots on "A" target at 200 yards. Frank Halama 122-11V and J. Ventres 121-14V made up the five scoring members. Ed Hogan of the Quinnipiac Team from New Haven is the first person to make a possible 125 score this season.

In this popular league the shooters operate the pits and score as well as shoot. Metallic sights must be used but caliber and weapon is pretty much a "shooter's choice." Shooting is all slow fire and the course is 5 shots each in prone, sitting and kneeling positions, and 10 standing, all at 200 yards on the military "A" target.

The WYATT .45 TARGET pistol—a conversion of the German Luger auto pistol to an accurized target pistol shooting the .45 ACP cartridge—and a test target.

A LUGER TO .45 ACP TARGET PISTOL CONVERSION

The mention in the report of the Idaho State Pistol Championships (Aug. issue) that the State Champion, Kenneth W. Wyatt, 718—16th St., Lewiston, Idaho used a German Luger pistol converted to shoot .45 ACP ammo in the center fire and .45 cal. matches, indicated something interesting to handgun shooters. In reply to a request for more information, Mr. Wyatt has written, in part:

"I cannot give you any details as yet on the mechanical changes necessary in converting the Luger pistol to .45 ACP caliber, except to say that it is a major undertaking. I spent a considerable part of my spare time for a period of about a year before I was able to obtain satisfactory results.

"After I got mine going, I took in a partner, Elmer Imthurn, ballistician for CCI, and he built himself one. We proceeded to take these two guns around to various matches throughout this spring and summer and after finding them so enthusiastically received by a good number of shooters, we decided to put them on the market. The total cost, where the customer furnishes the Luger, will be $150.00.

"We now have two different guns. One (shown in photo) has a six inch barrel and weighs 42 ounces. The other has an eight inch barrel with flattened sides, rib, and sights on the barrel and weighs 43 ounces. The rib, however, is only an innovation as yet, and is not included in the price.

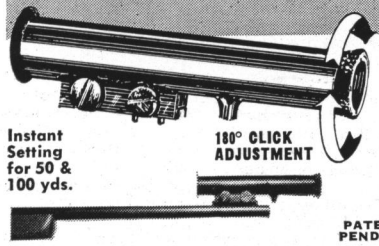
"The target shown with the 6 inch barrel gun is an authentic 50 foot gallery target, one of the first I shot with it, and so far is the best one I have been able to shoot. It was fired slow fire at 50 feet in front of several witnesses, and although it might not look like it, it scored 99. The holes appear small due to the fact that the bullets were round-nose type, but a scoring plug clearly shows that there is only one 9. I have shot many similar targets since, but none that scored quite so high.

"The Luger pistol, of course, has long enjoyed a good reputation for accuracy, even with short light barrels and military loadings, so the main problem in the conversion was one of functioning—not accuracy. The six inch barrel gun has now fired 1440 rounds consecutively of registered outdoor competition without an alibi run. The eight inch gun's record is nowhere near this good, but is still probably better than average for the service automatic, accurized or otherwise. Furthermore, we know what is causing the trouble in the eight inch gun and will soon have it remedied. The two magazines, at present, are not built exactly alike, but they soon will be.

"If you are familiar with Luger pistols, you know that the barrel screws solidly into the receiver as a barrel should, and that the frame acts, in principle, as a small machine rest in which the receiver recoils. Thus far, this principle appears to be quite sound, both functionally and accuracy-wise. The action also appears to be sufficiently strong to handle the .45 ACP cartridge, as the six inch gun has now fired approximately 5,000 rounds including testing, practicing, tournaments, etc. Quite a bit of this shooting was done with full power service ammo. and in some of my testing, I actually went as high as 8 grains of Bullseye with a 195 grain test bullet without any evidence of strain or trouble. If you are familiar with Bullseye powder, you

(Continued on Page Nine)

NEW! DUAL-RANGE FRONT SIGHT



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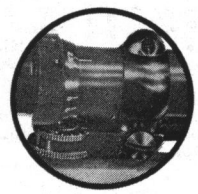

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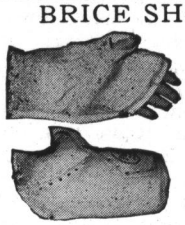

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NEW 1960 GUN DIGEST
By Kent Bellah

Editor John T. Amber's all new, 14th edition of the 1960 GUN DIGEST is the best book value. It cost a grand fortune to fill the 324 big 8⅛ X 11 pages with 35 top articles by gun experts, thousands of photos and 18 departments. This big, interesting volume is just too big to review at one sitting. It packs a lot of gun facts.

You'll like Col. Whelen's "Days of The Krag" to bring back fond memories of the outrigger magazine rifle with the slickest action, that created Hoppe's No. 9 Solvent. Mack Stirman's idea on how to own a quality varmint rifle at about half price is good. You may get new ideas from Wilhelm Brenneke's life story, his Mauser action improvements, his more deadly bullets, and other ingenious inventions. In "War Surplus Weapons" Bob Wallack says they are no bargain; Bob Brenner says they are. You'll agree with one Bob or the other, and may or may not want a rack full of 89¢ clunkers.

You'll have to read "British Cartridges" to be well informed. "Shotgun Fallacies" lets the air out of myths that many shotgunners believe. Elmer Keith's fans will like his "Sixgun Miscellany". E. M. Yard's dope on building a $150. counter chronograph is good. Warren Page gets peeved about gun writers and hunters being charged by animals in "Charges are the Bunk," and he makes a point. "Everybody's Target" is woodchuck hunting dope. Do and Don't suggestions to avoid "Too Many Cripples" is good for all of us.

"American Smokeless Powder Cartridges" has details and dimensions on rare and not-so-rare rounds. "American Bulleted Cartridges" is a good check list, and guide to performance. Both men and women oughta read "Arms and Women" by Ruth Douglas, a Vermont lady who knows her guns.

Don Johnson, in "Handguns For Hunting" correctly says they are "the HANDiest gun!" My own "Precision Cast Bullets" has a lot of rifle and handgun dope you haven't read in this magazine, including the .30 caliber H-B bullets that rival jacketed types in accuracy and velocity. Bob Wallack nicely covers U. S .rifles and shotguns, and I wrote the Handgun Review.

Departments list specifications and prices on all U. S. and foreign guns, scopes, mounts, sights, ammo, handloading equipment, etc. Ray Riling, prominent gun book dealer, reviews many books you'll want in your library. "Artistry in Metal," "Miniature Guns" and "Power For Engravers" will interest lovers of the rare and beautiful. The superb cover painting of an engraved 1854 Volcanic pistol, Smith & Wesson's forerunner of M94 Winchesters is done as only James M. Triggs can do it. His paintings are art treasures, as are his many exploded drawings in this 14th edition.

The GUN DIGEST isn't good because I write for it. I write for it because it's good! It still has the low $2.95 price because it's the most popular gun book, running over 2 million copies this year. At many dealers or postpaid from The Gun Digest Co., 227 W. Washington St., Chicago 6, Ill.

L. L. F. BULLET SWAGING DIES

Several months ago I saw in SHOTGUN NEWS (the all advertising monthly newspaper) an ad from BOB'S SPORTING GOODS, 1281 Highway 99 North, Eugene, Oregon, offering bullet swaging die sets for $40.00. A request for information brought a 1 page mimeographed information sheet, a sample .270 cal. bullet and a note from Mr. L. L. Franssen, proprietor of Bob's Sporting Goods.

Still interested, I suggested to Mr. Franssen that if he cared to send a set of the dies for .224 cal. bullets on consignment, I would be glad to test them and report on them. A set of the dies arrived in a short time and as soon as I could get a supply of .705" Sierra jackets and lead wire, I started making bullets and shooting them. I have now made over 1500 bullets in the dies and have shot several hundred of them in four rifles, one chambered for the .222 Rem., one for the .220 Swift and two for the .219 Donaldson, and feel that I can make a fair report.

The die set is quite different than others I have used. Refering to the photo of the parts of the set; number 1 is the "Punch Body" which goes in the head of the press, where the dies are usually located, and carries the "Bullet and Core Seating Punch" (number 2), the punch for core seating on one end and that for the bullet swaging on the other end. Number 3 is the core seating die and number 4 is the one piece bullet swaging die. Number 5 is the ejection pin and arm that replaces the priming arm on the loading press.

For my R. C. B. S. Model A press, the dies (3 and 4) replace the removable shell holder on the ram top (on some presses a separate shell holder ram is required and is supplied with the die set). Both the core seating die and the swaging (bullet forming) die have holes in the bottom through which the ejecting pin passes. The cores are seated base down and the bullets are swaged point down. The lead wire bullet cores are not performed in an extrusion die but are seated in the jacket as cut and swaged to fill and expand the jacket in the core seating die. A lead wire cutter for cutting the cores to uniform length is an extra to purchase or make, in case one does not already have one.

Adjustment of the dies is by trial and error, as is the case with other makes. However, the adjustments cannot be locked when once found, as in other sets, since the double and combination core seating and swaging punch must be readjusted each time the operation is changed. This does result in somewhat more rejects when making the adjustment each time for each operation. The ejecting pin and arm appear to be accurately made for fit in the press they are designed for. The arm flips out of the way on the up-stroke of the ram and is pushed back into line with the thumb as the downstroke of the ram starts, the pin lining up with the holes in the bottom of the dies very accurately.

My system of operation was as follows: I adjusted the lead wire cutter to cut the desired weight core for the weight bullet I wanted by setting my Redding scale for the weight bullet I wanted, putting an empty jacket on the scale pan, and then adding the cut wire core for

checking. When the average minimum weight core balanced the scale I locked the cutter adjustment and cut a batch of cores.

In seating the cores I pre-lubricated the **outside** of the jackets by pushing them, base down, through a snug hole on a felt pad, mounted on a block of wood, and impregnated with the lubricant used. With the scale set for the weight bullet wanted, I put an empty jacket on the pan and then added a cut core. If the scale balanced within 1/10 grain, plus or minus, I put the core in the jacket and then into the core seating die for seating and expanding. If the combined core and jacket weight was more than 1/10 grain over weight, I trimmed a little lead off the end of the core with a jack knife until the scale did balance within my determined tolerance; if more than 1/10 grain under-weight the core was discarded, to perhaps make a lighter bullet in another batch.

The above may seem like a time-consuming job but, since a good wire cutter will make quite uniform weight slugs, a majority of which will be within the weight tolerance, it actually goes along quite rapidly. It is less than the combined time of pre-swaging cores in an extrusion die, degreasing the cores, stuffing in the jacket and then seating in the die, as in the favored expanding up system of bullet making; but I doubt the results are quite as good.

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In ejecting the core seated jacket, the ejection pin does leave a mark on the base of the bullet that remains in some degree after the bullet is swaged. If an overweight core is seated, the extra pressure will pop some of the lead core through the unsupported base of the jacket over the ejection pin hole, for a reject bullet.

As mentioned before, the bullets are swaged point down, the punch being adjusted so that the ejection pin will bear on the rim of the hollow-point of the bullet to eject it. I re-lubricated the core seated jackets before swaging, in the

(Continued on Page Nineteen)

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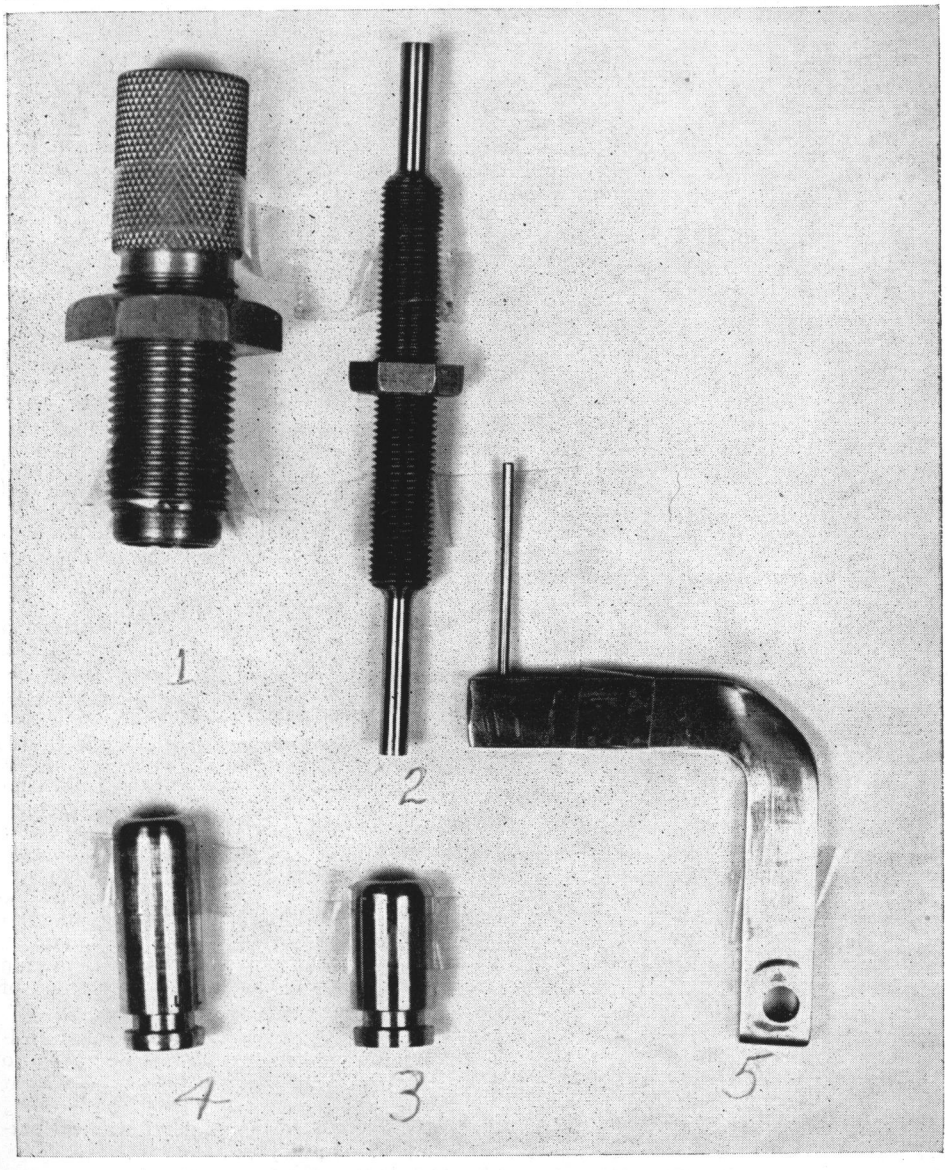

The L. L. F. jacketed bullet making die set.

A Luger To .45 ACP Target Pistol Conversion

(Continued from Page Seven)

know that this is an extremely heavy load.

"The pistol is extremely easy to shoot. Practically any weight of trigger pull down to 2½ pounds and even lower can be obtained with perfect safety. The final let-off is fairly good, approximating that of a Colt Match Target that has been tuned up. The gun is especially easy to shoot in timed and rapid fire. The recoil is light, quick, and the muzzle jump is quite confined. The action is very fast. Some slow motion pictures that we took show that the complete action cycle takes place in 3/64 of a second. It is so fast that the shooter cannot detect it, either by sight or feel. Someone standing alongside and watching closely can see a slight blur as the action functions, but that is about all.

"All in all, it is the finest shooting and easiest to shoot center fire handgun for the Standard American Pistol Course that I have yet fired, and in the course of the past 13 years I have tried most of them, if not all. The better .22 target autos are slightly easier to shoot, but only due to the fact that their recoil is lighter.

"I originally built this gun, not with any thoughts of commercializing on it, but rather because I, like a host of other shooters, was dissatisfied with the existing .45's and Center-Fires. However, it appears that the idea may become popular, and therefore I have applied for a patent on it, just in case."

Mr. Wyatt's information appears to be interesting, especially to tournament handgunners, and we have given his mailing address at the start in order that he may be contacted directly by such interested shooters.

PHT

National Bench Rest Shooters Association, Inc.

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Individual annual dues $5.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) $2.50. Life membership (after January 1, 1959) $75.00. Annual club affiliation fee $10.00.

DELAYED RECOGNITION OF A 1958 RECORD TARGET

At the first registered shoot of the Detroit Bench Rest Club on April 20, 1958, Raymond A. Novak, at that time a resident of near-by Highland Park, Mich., fired a 10-shot group at 100 yards with Varmint Rifle that was range measured at .280".

That target was submitted through regular channels for judging as a possible new record. By some unfortunate and presently unknown circumstance, that target got into the files at the President's office instead of being forwarding to the judging committee for measurement. The target was turned up in late Spring of 1959 and was then sent to the judging committee who measured it as an official .2953 inch and, since it was fired in 1958. it has been recognized as the standing official record for 10 shots at 100 yards with 13 lb. class Varmint Rifle.

For shooting this target Mr. Novak used the .22 Rem. cartridge in an Apex premium grade barrel on a Model 54 Winchester action. the rifle being built by M. J. Chandler of Wessel's Gun Service in Detroit. His scope was a 10X Unertl and his load was 22 grains of 4676 powder and 52 grain bullet made by Berger. The rifle weighed 11 lbs. and at the time the target was shot, had 2800 rounds fired through it.

PHT

The six bench rifle range of the Dryden Fish and Game Club in the western Finger Lakes region of New York State.

TWO NEW NBRSA DIRECTORS ELECTED

Robert W. Smith of Dallas, Texas, the 1958 National Bench Rest Champion, has been elected Director for the Gulf Coast Region for a two year term beginning January 1, 1960. Bob Smith has been an NBRSA member since 1951 and has been a competitor in all National Bench Rest Shoots to date. A former resident of Portville, N. Y., he moved to Texas on a business assignment and has since been active in Texas and Gulf Coast Region bench rest activities.

R. G. Berry of Pawnee, Oklahoma, has been elected Director for the Mid-Continent Region for a two year term beginning January 1, 1960. Bob Berry has been an NBRSA member since early in 1956. He has served as secretary for the Tulsa Bench Rest Rifle Club for some years, leaving that position at the end of the 1958 club year. He is a regular competitor in Mid-Continent shoots.

SUCCESSFUL FIRST SEASON FOR NEW YORK CLUB

Starting from scratch in the Spring of 1959, the Dryden, N. Y., Fish and Game Club has built a six bench range and has held three Varmint Rifle bench rest matches with a quite good entry for a previously untapped bench rest shooting area. Nearly all the competitors have been shooters without prior experience in formal bench rest matches.

Ed Shilen, Club Vice-President, writes: "I am enclosing a picture of our range (photo above). It may be of interest to any club which is considering building a bench rest range.

"We have just the barest necessities; benches, target frames and backstrip, and our matches have been successful. We would recommend any club to start out small and add on as needed.

"Our plans for next year include six more benches, covered firing line and moving backers. Registered matches are planned for 1960."

The club does have a club-house on its grounds and there are ample facilities for camping on the grounds.

PHT

BENCH REST MATCH RESULTS EASTERN REGION CHAMPIONSHIPS

Fifty six competed in the Eastern Region Championship Matches for heavy bench rest rifles on the Wilkes-Barre, Pa., Rifle & Pistol Club range July 25-26. Weather conditions were excellent. The two "rests" classes were programmed and 22 competed in the "open rests" class, while 34 competed in the "limited rests" class. A trophy was awarded to the winner in each class and Regional Championship brassards were awarded to the five high in National Match Course aggregate in each class. The high aggregate scorers in each class were:

OPEN CLASS

	100 yds.	200 yds.	NMC
Omar Rinehart	.431 (1)	.667 (1)	.549
Howard Wolfe	.565 (9)	.722 (2)	.643
G. W. Schmidt	.479 (2)	.809 (4)	.644
E. Wojciechowski	.540 (5)	.818 (5)	.679
Clyde Yockey	.513 (3)	.844 (7)	.679
George McMullen	.534 (4)		
Bernice McMullen		.897 (3)	

LIMITED CLASS

Robt. F. Stinehour	.427 (1)	.675 (1)	.551
Robert W. Hart	.460 (3)	.683 (2)	.571
Charles F. Debaugh	.570 (8)	.737 (3)	.653
Dr. A. H. Garcelon	.491 (6)	.825 (10)	.653
M. H. Walker	.486 (5)	.823 (9)	.654
A. K. Glendening	.500 (7)	.817 (8)	.658
Williams Tardy	.469 (4)	.853	.661
Olive M. Walker	.443 (2)	.883	.663
R. Stolle		.768 (4)	
J. M. Reece		.769 (5)	

Five and ten shot preliminary matches each day, including the popular "Turkey Matches," made a full program of shooting with a good distribution of prize winners. The "Turkey Matches" awarded a turkey to each squad of 10 shooters, squads being the units of 10 shooters as they entered for the match, and 21 turkeys were won. Some who did not win cash prizes were able to win a turkey.

PENNSYLVANIA STATE CHAMPIONSHIPS

Twenty five competed with unrestricted bench rest rifles and seventeen with varmint rifles in the Pennsylvania Bench Rest Championship matches, sponsored by the Altoona Rifle and Pistol Club on August 9th. The championship aggregate consisted of five 5-shot matches at 200 yards and five 10 shot matches at 100 yards. Average grouping was unusually small. The largest group to win a 5-shot match at 200 yards was .560", and the largest to win a 10-shot match at 100 yards was .410". Robert Stinehour, Newburgh, N. Y. won the open championship and Clyde Yockey from Apollo won the closed Pa. resident championship. Clark Meckley from York, Pa. won the Varmint Rifle championship. The high aggregate shooters were:

Unrestricted Rifle

	200 yd.	100 yd.	Grand
Robert Stinehour	.3137	.4798	.3967
Omar Rinehart	.3825	.4290	.4057
Clyde Yockey	.4520	.4118	.4319
Ray Geitner	.3508	.5844	.4676
John Hutchinson	.5275	.4444	.4959

Varmint Rifle			
Clark Meckley	.4876	.5020	.4948
Kenneth Burket	.5595	.7574	.6584
C. J. Detsch	.6949	.6690	.6815

William Kerr, Red Lion, Pa., shot a .240" 5-shot group at 200 yards, which range measurement is smaller than the existing record. Clark Meckley shot a 10-shot group at 100 yards with Varmint Rifle measuring .330", which is smaller than the 1958 record.

Bernice and George McMullen, Minerva, Ohio, won the two-man team Kline Trophy match, and the four-man team of Rinehart, Yockey, Bernice and George McMullen won the William Shaw Trophy match.

WINDSOR, ILLINOIS

The nine who competed in the registered night shoot at Windsor, Illinois, July 25, shot some fantastic small groups and aggregates. Harold Cole, Windsor, shot a .380 **INCH** 10-shot group at 200 yards, and another of .595 inch. Ted Holmes most consistent shooting gave him a 100 yard aggregate and NMC agg. that threaten existing records. Five of the nine shooters made NMC aggregates under half minute of angle. They were:

	100 yd.	200 yd.	NMC
Ted Holmes	.313	.427	.370
Harold Cole	.353	.402	.378
Barbara Schellert	.427	.454	.4405
William Schellert	.439	.453	.446
Alfred Walter	.435	.480	.458

Holmes, Cole and Wm. Schellert shot Ted Holmes Gun Shop barrels, while Barbara Schellert and Walters shot Hart barrels.

BUFFALO, WYOMING

Entry in the mid-summer shoot of the Buffalo Outdoor Rifle Club was a bit smaller than usual but the 15 shooters came from 7 states (Wyo., S. D., Ariz., Calif., Wash., Mont.and Penna.) and the shooting was of high order and hotly contested. Clair Hollingsworth, Rapid City, S. D., made a 200 yard aggregate which range measured .3671 m.o.a., that measurement being smaller than the presently recognized record.

The National Match Course was fired with both unrestricted and varmint rifles, the varmint rifle matches being fired in the afternoon of the two days (July 18-19) while the unrestricted rifle matches were fired after 7 o'clock in the evening.

The high ranking shooters in aggregate were:

Unrestricted Rifle	100 yd.	200 yd.	NMC
I. F. Jack Williams	.415	.4742	.4446
C. Hollingsworth	.542	.3671	.4545
L. E. Wilson	.413	.5115	.4622
Bruce Pheasant	.471	.4601	.4655
Charles Pool	.530	.5485	.5392
Frank Minucci	.464		
Varmint Rifle			
Bruce Pheasant	.654	.5938	.6239
Harold Bing	.652	.8173	.7346
Jack Williams	.778	.7540	.7660
C. Hollingsworth	.717	.8182	.7676

AUGUSTA, OHIO

Twenty nine competed in a night match on the Reed's Run Rifle Range, firing the National Match Course, August 1st. Top ranking aggregates were:

	100 yd.	200 yd.	NMC
Earl Thompson	.288 (1)	.589 (2)	.439
Paul Gottschall	.349 (3)	.579 (1)	.464
James Whetstone	.345 (2)	.627 (4)	.486
Clyde Yockey	.416 (6)	.606 (3)	.511
Ernest Scafuri	.351 (4)		

Robert Settle of Parkman, Ohio, exposed himself to bench rest competition in this match, won place money in four of the ten matches, and is now down with a case of bench rest fever.

PLAINFIELD, NEW HAMPSHIRE

Twenty four competed in the National Match Course on the Plainfield Rifle Club range July 18-19; twenty shooting the 100 yd. stage on Saturday afternoon and twenty three the 200 yard stage on Sunday. With the bright, hot sun and high humidity, the little fishtail breezes gave a little bodily comfort but no peace of mind to some of the shooters.

Mrs. Mary Hollidge won two of the 100 yard matches and was runner-up in the other three to make a decisive win of the 100 yard aggregate. A composite of her first three targets would have made a 30 shot group that many would have been happy to have for 10 shots. Top NMC aggregates were:

	100 yd.	200 yd.	NMC
Robert Stinehour	.483 (5)	.536 (1)	.510
Howard E. King	.429 (2)	.663 (6)	.546
Mary Hollidge	.397 (1)	.698	.548
Crawford Hollidge	.481 (3)	.618 (3)	.550
Emory L. Tooly	.504 (6)	.619 (4)	.562
A. H. Garcelon	.482 (4)		
P. H. Teachout		.563 (2)	

Five of the twenty four shooters were competing in their first bench rest match. Bob Stinehour won the special $10.00 award for aggregate of first match at each 100 and 200 yards. Howard King took the special $5.00 award for winner of last 100 yard match and Crawford Hollidge the duplicate for last 200 yard match.

FLORISSANT, MISSOURI

Ten shot the NMC with unrestricted bench rifles at the Nine Ring Sportsman's Club range, near St. Louis, July 19th, with good weather, little wind but some mirage. High in the aggregates were:

	100 yd.	200 yd.	NMC
William Schellert	.464 (1)	.559 (1)	.511
Al Walter	.482 (2)	.598 (3)	.540
Ted Holmes	.610 (7)	.586 (2)	.598
Barbara Schellert	.534 (3)		

Seven of the ten competitors, including all the aggregate winners, were shooting barrels from Ted Holmes Gun Shop.

ON AUGUST 16th eight shooters fired the NMC with heavy Varmint Rifles in weather that ranged from sunny to cloudy and some rain with some wind. The top ranking aggregates were:

	100 yd.	200 yd.	NMC
Al Walter	.498 (1)	.593 (1)	.521
Arthur Freund	.498 (2)	.614 (2)	.556
Barbara Schellert	.533 (3)	.657 (3)	.595

Al Walter comments: "In this part of the country it seems as if the Varmint rifles will step out ahead of the bench rest rifles as the shooters find that they can use the rifles for two different kind of sports. New members are coming into our club at each shoot."

All three top shooters used the .219 Don Wasp cartridge, Walter in a Day barrel on S & L action with 10X Unertl scope, Freund in unknown barrel on Mauser action with 20X Litschert scope, and Mrs. Schellert in Holmes barrel with 20X Lyman.

ST. LOUIS, MISSOURI

On August 9th the St. Louis Bench Rest Rifle Club held a registered match consisting of five 5-shot and five 10-shot matches, all at 100 yards. The day was cool but with considerable mirage and a light variable breeze. A partly cloudy sky kept the light conditions constantly changing.

Ten year old Linda Ernst, shooting a Schultz and Larsen bench rest rifle that she could barely reach around to get to the trigger, won the 5-shot agg. with .353, was second in the 10-shot agg. with .453 and won the grand agg. with a .403 average. This was the first time that Linda had shot a bench rest rifle in competition, but she has done quite well shooting her .17 Javalina in the light Varmint rifle matches this year.

Next ranking shooters in the grand agg. were: Arthur Freund .414, Marlin Gray .540 and Harry Ferris .573.

KANSAS CITY, KANSAS

The Mill Creek Rifle Club held its first bench rest shoot on its newly completed 15 covered bench range the night of July 18th with a disappointing entry of only 8 shooters, but an interested crowd of spectators numbering over 100.

Conditions were good and we figured all movement was caused from target light heat. We plan to move target lights overhead to eliminate heat rise.

	100 yd.	200 yd.	NMC
L. F. Carden	.346 (1)	.487 (2)	.417
H. G. Baucher	.402 (2)	.470 (1)	.436
H. W. Barton	.474 (3)	.560 (4)	.517
H. E. Powers	.577 (6)	.502 (3)	.539

If weather permits, we plan another registered shoot around the first of November.

L. F. Carden
2211 N. 44th St.
Kansas City, Kans.

IOWA FALLS, IOWA

The July 26th registered shoot for unrestricted bench rest and Sporter rifles at Iowa Falls had a total of 13 competitors. The National Match Course was fired with each class of rifle. The top ranking aggregate shooters were:

Unrestricted Rifle	100 yd.	200 yd.	NMC
Joe Dunnington	.541 (2)	.604 (1)	.572
John Anderson	.574 (2)	.663 (3)	.618
Vivian Duncan	.599 (3)	.661 (2)	.630
Sporter Rifle			
Otto Filbrandt	.724 (1)	.945 (1)	.834
Verle Hunt	1.007 (2)	1.033 (3)	1.020
John Anderson	1.101 (3)	.972 (2)	1.036

Seven of the eight shooting Sporter Rifle were using one of the 6 m/m cartridges, the eighth shooting a .308 Win. factory rifle.

DETROIT, MICHIGAN

On July 19th the Detroit Bench Rest Club held its second match of 1959 with 21 heavy rifle shooters and 4 Varmint rifle shooters. All shot one 5-shot warm-up match and an aggregate of five 5-shot and five 10-shot matches at 100 yards.

With the heavy rifle, Earl Thompson shot smallest 5-shot group of .135 and Al Johnson the smallest 10-shot group of .295. In the Varmint class, Russ Hope shot smallest 5-shot group of .245 with a Sako rifle and Ray Novak shot smallest 10-shot group of .405 with a 12½ lb. custom rifle.

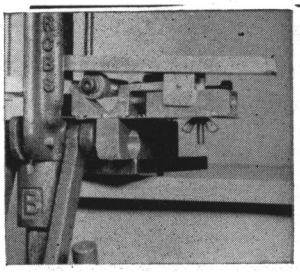
The aggregate winners were: 5-shot—James Whetstone .306, Bernice McMullen .325, Earl Thompson .334; Varmint rifle, Harold Campau .494. 10-shot—Omar Rinehart .404, Paul Gottschall .405, Donald Combs .455; Varmint rifle, Parker Rollins .622. Grand aggregate—Rinehart .376, Gottschall .3765, Combs .3955; Varmint, Campau .6525.

In the Varmint class, three shooters were shooting 9½ lb. Sako rifles against Novak's 12½ lb. custom rifle. Both James Whetstone and Russ Hope were using bullets made by Novak in Bahler Die Shop dies.

DRYDEN, NEW YORK

On August 16th the Dryden Fish and Game Club held its third Varmint Shoot of the year with 11 competitors shooting heavy varmint rifles and 1 a light rifle. Shooting an aggregate of two 5-shot and two 10-shot matches at each 100 and 200 yards, the top five shooters were:

	100 yd.	200 yd.	Grand
Russ Cuatt	.938	.801	.869
Ray Wilson	.762	1.028	.895
Ross Sherman	.768	1.064	.916
Ed Shilen	.671	1.347	1.009
Earl Johnson	.895	1.131	1.013



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WITH THE CLIMAXES of the present shooting season past, the "Hot Stove Leagues" will soon be in operation. Time then to pass along some of the helpful kinks you have learned that may help others, especially the less experienced shooters, handloaders and "hobby" gunsmiths.

THE INFORMATION BENCH

The Information Bench service is available to all Precision SHOOTING readers. With your questions, send a large, stamped, self addressed return envelope for a reply. Selected questions and answers, covering as wide a variety of interests as possible, will be published in these columns. Address your questions to the following people.

Bench rest, varmint and hunting rifles, accessories, handloading, components and shooting methods—**M. H. Walker, THE INFORMATION BENCH, RFD #1, Box 118, Mohawk, N. Y.**

NRA and Free target rifles and shooting—**Roy F. Dunlap, 2319 Ft. Lowell Rd., Tucson, Arizona.**

Sporting handguns and loading—**Kent Bellah, Saint Jo, Texas.**

American Single Shot Rifles—**Rupert S. Hill, 325 James St., Elkhart, Indiana.**

Question: Enclosed is a series of 10-shot groups fired by Russell Seckles. Caliber .22-250, 32 gr. 3031, 63 gr. Sierra S. P., rifle has Douglas Premium Grade barrel chambered and fitted by Douglas a couple of years ago. During our Varmint matches when Russ fires in our 100 yard matches you can follow the bullet flight to 50 yards by a streak of smoke. Rifle is accurate. Our gang is quite curious as to why the targets are smoked. No sign on 200 yard targets. What would be the cure? John E. Kaylor, Altoona, Pa.

Answer: Those gray marks on the 100 yard target are molten lead. As soon as the velocity of a bullet reaches about 3000 feet per second, exposed lead tips start to wash off from friction in the air. As the lead becomes heated it spins off due to centrifugal force. Nearly pure lead with only a little antimony (about 1%) is generally the least affected because of its relatively high melting point. Lead with a high alloy content is easily affected by friction because of its low melting point.

These marks may also be caused by the lead spilling out through a bullet jacket which has been slit through by the rifling. This occurs with very thin or very soft jackets at high velocity. Since you have reasonably good accuracy, it is unlikely that this occurred. M. H. Walker

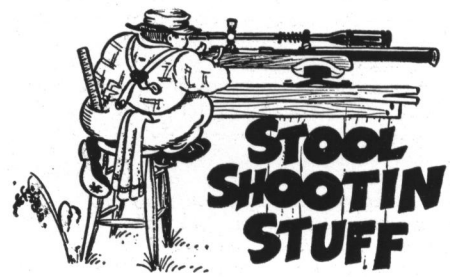
Questions: I want to get a set of bullet making dies in the near future. In your opinion, what make of dies are the best in price and quality? What do you think of Bahler dies?

A friend of mine has a set of Culver dies. The dies turn out bullets of two sizes, as he has two swages. One size is .2241 and the other .2248 with a slow taper from base to where ogive starts. I thought the sides of bullets were supposed to be parallel. Is this true? How do you determine the size of bullet swage to get? Leslie E. Smith, Jr., Uniontown, Ohio

Answer: According to Phil Teachout, the editor of Precision Shooting, Bahler dies are O. K. Reports from others indicate satisfaction. I have no personal experience with them. Most of my bullet dies are Biehler and Astles. The workmanship on these dies is obviously good, but the price is high. If you expect to win at bench rest, price should not be the limiting factor, it is quality you are after.

None of my dies make bullets with a perfect cylinder near the base. All have at least .0002-.0003 enlargement at the base end with more or less taper towards the point. This apparently does no harm and may be advantageous in reducing friction (fouling) and improving the velocity pressure relationship. The so called "base band" bullets were claimed to have advantages along this line. This is a bore diameter bullet with a short, say 1/16", band of groove diameter at the base. It is a foregone conclusion that bench rest shooters will eventually try this type bullet.

Your bullet die should produce bullets within .0003" of your barrel's groove diameter. When buying your barrel ask the maker for the groove diameter dimension, then order your bullet die accordingly. M. H. Walker.



Dear Phil:

The Lewistown shoot was a very interesting one in that it was made up of a sizable crowd of shooters who were there to enjoy one another, and the nice facilities that the Lewistown range has. The club has just built this year a new loading area about 10 yards back of the firing point, and running most of the length of the line. The covering is very solidly built with a nice metal roof, and the area leveled and graveled. As you perhaps recall, Lewistown has very rugged benches made from heavy railroad tie units. The Lewistown boys have a very good system and the statistics are accurate and available soon after each relay. The clubhouse facilities are very pleasant and the meals served at noon each day were adequate for even the most hungry shooter.

The pleasant surroundings perhaps contributed some to the spirit of goodwill and tolerance that existed there from the moment the crowd started to arrive until the last one had gone. As you noted in the July issue, there originally had been registration for two classes; however, Paul Wagner did such a wonderful selling job over the public address system that he enticed all of the shooters to go in to one class. Some big concern certainly ought to employ him in a hundred thousand dollar a year sales manager job. Paul is typical of the Lewistown club boys in that I know he likes to shoot, has some nice equipment with which he would like to have demonstrated his prowess, but he gave all that up to be the range officer. Dutch Aumiller has been giving us tough competition all year too, but he and some of the other local shooters ran the target detail.

Some of these shooters interpreted the swing to shooting all in one class to

mean that the hassle between the two classes is being eliminated. I am not sure that such is the case but I do know that there is not such a harsh feeling as existed last year. The sandbag boys came out all right but at that particular shoot, the conditions were very rough and we had what was dubbed a 3" Club as one after another of the shooters at the 200 range became eligible for membership.

Instead of driving back to Cape Cod directly after the shoot, I went a little further west and north by way of Taylor and Robbins. It was pretty near Clair's bedtime when I reached his house but we changed that situation by talking another 4 hours on the subject which is dear to both of our hearts, as well as the hearts of you readers. Clair has done a lot of shooting in his day and he definitely knows when a gun is shooting well but what is more important, he knows how to make one shoot well when he finds it with bugs in it. My particular reason for looping out of the way was to pick up a new Taylor and Robbins 7 m/m Magnum that Clair and Don had been making for me. They had previously mailed me some of the targets and I had sent them some of my bullets to test in it. If somebody had told me a few years ago that a medium weight hunting rifle would shoot considerably better than a minute of angle in a blown out Magnum case, I would have been a little skeptical. I even wondered whether or not when I got home I could come anywhere near doing as well as Clair had done in the test firing. The day I went out to fire it, I only had a thin cotton shirt between my skin and the butt plate but I made several half inch groups from the 100 yard bench and I believe that I can do even better when I am not being punished quite so severely with a 68 grain load of 4831. Some of the new factory rifle makers had better take notice of such accuracy. I heard of one Western concern who felt that he had no apologies for a 4" group. I kind of agree with him because I have seen so many of the rifles that will do no better than that and I can see where he has accustomed himself to thinking that four inches is good enough. Perhaps I am wrong in thinking that rifles ought to do better, but I see no reason why hunting rifles shouldn't do at least a minute of accuracy shot from the bench. Factory bullets are getting better all the time and I know the manufacturers are watching closely the bench rest results. I recently had a talk with Mike Walker on this stepping up of our standards of accuracy. He takes a little pride in the part that he has played in improving the results obtained by the Army marksmanship unit. He spent a lot of time thinking about, and working on their problem and should get some credit for it. The significant point is that folks working together and undoubtedly taking advantage of some of the things that the benchrest boys have demonstrated have now upped the standards of performance to a level that was hardly hoped for a year ago. Even the big 30 caliber jobs are making some marvelous groups.

We benchrest shooters continue to progress. The boys shooting varmint rifles with benchrest technique are making groups that are smaller than were recognized as records for the heavy rifles just a few years ago, and I think the classes for varmint rifles and sporter rifles are going to grow tremendously as soon as Mr. Average Gunowner gets over his reluctance to enter a match. These fellows often have good rifles but they are afraid that they will lose face if they enter a match and don't come out on top. If they would just stick at it a little longer and shoot a few relays, they would find that they, too, would greatly improve their groups and they would also find out that the fellow who had the hot group in the first match might be half way down the list on the second or third match. Indeed, that is one thing that has been demonstrated throughout the big shooting matches over the last few years. A shooter may be red hot for a match one week and a week later find that he is in among the average. We don't like to think of this game as one of luck; however, it only takes a few bad guesses on wind or mirage to put you out of the running, and it is entirely possible that the relay that you are shooting in might not be subject to quite such favorable conditions as the shooters had in the preceding relay. The element of competition is great in the game but the competitor to be watched closest is the guy who is customarily sitting behind your gun. He is the fellow you are out to beat and if each shot that you make is as good as you can possibly make it, preferable a little better than the shot before, you will find that the game is a good one, of lasting interest, and great satisfaction even though continually interspersed with periods of dissatisfaction.

As I write the above thoughts, I am particularly aware of the feelings that I had as I came home from the DuBois and Lewistown shoots. I had contributed generously to both of them, and although I had a very good time, I was disappointed in my shooting. I knew I was the guy who had to do better and I kept working at it to improve every little detail. There was one pattern that I noticed through many different shoots and because of its general trend, I was beginning to worry about my eyes, fearing that they were fatiguing throughout the length of the match because I would generally shoot some mighty small groups the night before or the morning before the matches started, and I would almost always start out in the very top brackets for the first match or two. Along about the middle of the morning, my groups would open up, occasionally giving me a shot too far out of the group to be accounted for by conditions or my holding. That's why I wondered if my eyes were fatigued and somehow were relaxing just as I pulled the trigger. Such a condition is definitely possible, especially if scopes are not properly adjusted so that strain is avoided in looking through them.

This pattern went on through a series of different guns and different bullets; however, I was using the same scope for most of the events as I felt that that scope was the one that gave me the best sight picture. I had frequently tested it to see that the mounts stayed tight and that the adjustments were properly lubri-

(Continued on Page Fourteen)

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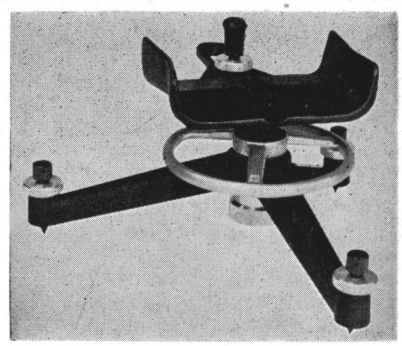
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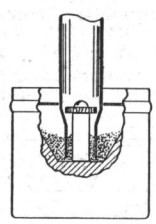
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Stool Shootin' Stuff

(Continued from Page Thirteen)

cated. I had even perfected an improvement on the scope which, through spring action, returned the scope to its stop point, and at the same time, twisted it on the rib. This was done because I had come to the conclusion that a mechanical device would return the scope to position with more uniformity than could be obtained by returning it and twisting it by hand. I had noticed that this opening up of my groups was more conspicuous on hot days and as I was examining my scope mounts for the hundredth time and looking over my stop and twisting device, I exerted a twisting pressure on the front bell of the 2" Unertl scope. I was confused when I found a movement of maybe 10 or 15 degrees, but none of that movement showed up as play in my new gadget.

Perhaps some of you fellows are having the same troubles that I had. After your scope has been exposed to a half hour or so of warm sunlight, see if you notice any play at the point where the bell assembly joins the main tube. The heat was expanding mine enough so that it loosened up and gave me that trouble. It seems to be possible to take that play out by exerting a lot of pressure on the locking screw on the bottom of the tube but it took me a long time to find that trouble.

We had a good time at Wilkes Barre and missed seeing you there. The boys got a great kick out of the turkey shoots and some of the lucky ones went home with two of them. I had to shoot to get mine, with a .270 group. The turkeys were awarded to the low shooter in groups of 10, based on the order in which they registered. Mike Walker was cussing himself for his big group in the first event until he found out that he was still best in his group of ten and had won his turkey with a group of about ½". Just to show us that he could do it the hard way, he came back in a later event and won another turkey with a very small group.

Shooting the first day was under rather overcast and moderate wind conditions and the sandbag boys were out in front. Sunday conditions were entirely different as one of those tricky mirages existed that shift from right to left. The wind would come in spurts and as suddenly die out as it shifted from one compass point to the other. Fortunately Wilkes Barre separated the two classes or the sandbag boys would have come home with pretty slim pickings. The mechanical rests boys certainly had the advantage for that day's shooting.

I was sorry not to get to the varmint rifle matches at Altoona and interested to hear that Joe Looper and George Morton had done well again. Joe had made himself up a new little light varmint job with a straight heavy barrel but it was so short that it came in to the weight limit. I understand that there was considerable griping because it wasn't turned to a taper to bring it down to .900 at the muzzle but apparently, the rules don't call for that and certainly turning a barrel down to that diameter in such a short length would not have made the gun shoot any better or worse. I, too, have a short model varmint gun and find that that 20" barrel will shoot just about as small groups as most of my other rifles. Perhaps this is an important point to think of, as a short barrelled gun certainly is easier to handle in and out of a car or in the field. As a matter of fact, the small groups that are being shot these days in the varmint classes seem to point in the direction of lighter weight and shorter barrels. As we get to experimenting more and more with powder, we find that for every cartridge and every barrel, there seems to be a suitable load that gives good results.

I thought well of the suggestions in the last issue for getting together an experimental plan. There seem to be a lot of details yet to be ironed out but I am inclined to throw my lot in with the group, in the hopes that jointly we can arrive at some of the answers that are plaguing the boys. We all approach them in our individual efforts and in the general benchrest game but perhaps it can be done on even a more scientific basis than that which we are now following. Collectively, a good tight organization could accomplish some marvelous results.

Cordially yours,

Ernest Stuhlreuter

Dynamics of The Bolt Action Rifle

(Continued from Page Five)

tion of the muzzle relative to this tangent for every 7 inches of bullet travel inside the bore. In absolute motion the muzzle was found to dip slightly at the start, but relative to the tangent it was found to deviate more and more without the relief of stress which is so necessary for the occurrence of vibration. This sort of motion may be simulated by opening several spans of a jointed rule and flipping with the wrist.

Nearly 20 years ago I determined a pattern of barrel motion by attaching styli to a light .22 rimfire barrel and causing it to write its own record. Whip, but not vibration, was recorded; but, as in all my other attempts to overthrow the vibration theory, this too was mostly wasted effort. As Mark Twain said, the less there is to justify a tradition the harder it is to get rid of.

Toward belief in the point system of support I was first lessoned as an amateur. Having read that a barrel should fit the stock, I reasoned that the better the fit the better the result. Accordingly I pressed the barrel and action of a tolerably accurate Marlin bolt rifle into plastic wood and let it set. The test wasted less than ten rounds of ammunition.

In the same period I bedded to a fine fit a Savage 19-M in a bird's-eye maple stock. It was more accurate than I could hold—for about three weeks; that is to say, until the stock changed its shape. Then I saw the light. Metal should touch wood only at the key places, two of these being small areas adjacent the receiver screws. Relief at all other places precludes contact when the stock warps, besides permits the metal to follow its natural bent. Subsequent correction of fault is fairly simple.

A valuable lesson in a different aspect of rifle behavior was learned after a sling swivel was experimentally mounted on a springy metal arm underneath a regular forestock. As I recall the shots strung up and down four inches at 50 yards. This taught that the forestock, unless attached to the barrel, should be very stiff for use with sling. The corollary is that a stiff forestock is needed if the full floating barrel assembly is to be used with sling.

Irregular ignition time affects the accuracy of a rifle in a dynamic way which may be convincingly reasoned from simple experiment. Put a scope on a rifle and dry fire in the prone position. A right-handed shooter may observe at trigger break that the crosshairs move about a minute of angle to left (10 o'clock for me) for a three pound pull, and considerably more if the pull is four. Try all the ways that you may devise for seizing the grip yet the movement is there (it could be absent in the case of the thumb hole stock).

The diagram of forces involved in trigger squeeze is shown in Fig. 4. O-1 is the line of the applied force, its direction being that of the forearm. Making an angle with the rifle it has the components 0-2 and 0-3, 0-2 equaling the weight of trigger pull, and being balanced by 0-4, the resistance of the shoulder. The component 0-3 tends to displace the rifle to the right; so, if the rifle is held steady on aim, 0-3 is balanced by an equal and opposite force 0 5 exerted to left by the sling hand.

When the trigger breaks the balance of forces is destroyed, and remains only the force 0-5 exerted by the sling hand, which pulls the rifle to left. Where the muzzle points when the bullet leaves depends on the resultant of this and the other forces such as recoil and whip. If ignition time varies so does this resultant and also does the place of bullet impact A hangfire gives a shot to left whose position may be anticipated if one follows through. A quickfire gives a shot to right of aim. Thus a rifle and ammunition combination may be accurate in a machine rest, and inaccurate in shoulder firing. These are two sufficient reasons why ignition time should be invariable in a shoulder arm.

Knowing something about the dynamics of the rifle, we can now account for some of its quirks. Suppose for example that the barrel makes a random contact with wood at some intermediate place in the stock groove. Change of stiffness and friction in the contact cause the bending curve to differ from normal, and also cause the plane of the curve to "roll" unless the contact is directly under the barrel. As pressure between surfaces in such accidental contacts varies, the barrel bends differently at different times.

In another case it is supposed that the receiver bears unequally in the stock groove at a place even with the forward receiver screw. Instead of bending straight down, the barrel will angle toward the side of most rigid support, this causing the shot to favor that side. As the manner of contact in the stock groove varies with heat in the metal and moisture in the wood, and further as this perhaps is the most critical section in the whole rifle, it is improbable that one zero will be held.

In another case it is supposed that an occasional high or low shot is being thrown. A probable cause of this is intermittent sliding (or failure to slide, as the case may be) at points 1 or 3, Fig. 1. Adjustment or modification at these points is first in order.

A fault of more abstruse nature may originate where the shoulder of the threaded barrel meets the end of the receiver shell. This is a potential source

of trouble because stiffness at this joint depends to a certain extent on pressure between surfaces. If the surfaces bear together harder at some particular point, obviously the bending will try to choose a transverse axis which passes through this place, with result that the curve will try to roll into the plane which is at right-angles to a diameter through the point of excess pressure.

Now the threaded end of the barrel is heated internally by firing; the surrounding receiver shell may receive external heat from a source such as sun's rays. Possible air cells in the threaded joint may retard the transfer of heat that would tend to equalize temperatures. It is not improbable therefore that the pressures between the shoulder surfaces will vary with respect to both place and intensity according to the stage of firing. Indeed it is likely that this is the place and source of most of the heat trouble in rifles that are affected by sun's rays. If this is so, the purpose might be better served if the threaded connection were locked tight by sweating soft solder into it instead of making it up with a wrench to crushing tightness. A stronger joint would be had with less effort and less need of skill, and it would be one in which internal strain were almost negligible, and needing only a blow torch to take it apart.

Sheridan "KNOCABOUT" .22 pistol

SHERIDAN "KNOCABOUT" .22 PISTOL

By Kent Bellah

The Sheridan "Knocabout" .22 is a gun that isn't great, or at least has no claim to fame in the past. It hasn't won any matches I know of. Only 16,000 have been made since 1953. The number should be 10 times that figure. The $17.95 price tag makes some shooters think it's best used for a trot line sinker. Nothing is further from the truth.

This is a sturdy, practical plinker, correctly named. It has a nice trigger pull and short hammer fall. Low cost ammo shoots well. It locks up tight. The hammer blow is adequate for fast, positive ignition, with the floating firing pin. The coil mainspring is good. It points and handles well. There is nothing I can detect that is apt to break or wear out quickly, even with abuse.

The 5" tube has a 1:12" R. H. twist with 6 lands. Bore specifications are .2141 to .2151, and grooves .2175 to .2185. Chamber diameter is .228 to .230". Stocks are checkered brown plastic, well shaped. Sights are fixed service type integral with the barrel, with a 4½" sight radius. The safety is a hammer block, correctly positioned for fast operation. The hammer cocks easily. The blue finish is matted on the barrel. Fitting and

(Continued on Page Sixteen)

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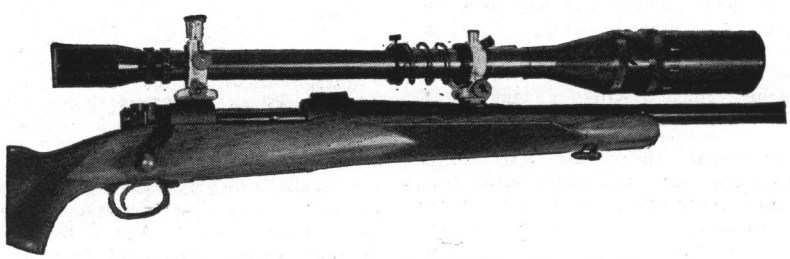

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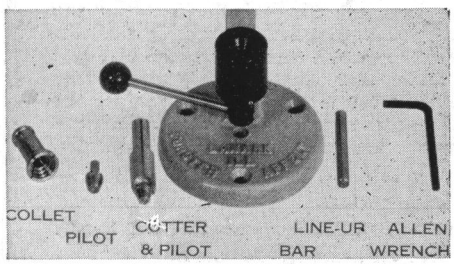

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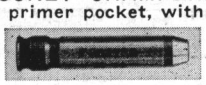

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Sheridan "Knocabout" .22 Pistol
(Continued from Page Fifteen)

finish is better than you expect on a low priced plinker.

The Knocabout is simple and safe for a beginner or anyone. Pressing the release button flips the barrel breech up and ejects a fired hull, so reloading is fast. If you throw it in a salt water tackle box and let it get covered with rust I believe it will still function. Farmers will like it for slaughtering. It's neat for a kit bag or trapper's pocket. Depreciation will be little even after years of hard use.

It has no sharp corners or edges. If you've snagged your hand or clothing on a sharp rear sight or hammer spur, you'll know what I mean. Makers of some expensive guns might take a tip! The barrel is very strong. One was fired with a .22 L. R. Hi-V cartridge after 7 .22 bullets had been driven in the barrel. The gun was not damaged, but don't try this stunt on any gun. Many people like the 1/16" non-snag ramp front sight, but I prefer a 1/8". My gun nearly centers groups at 25 yards.

Sheridan Products, Racine, Wis., make the well known Silver Streak and Blue Streak 5 mm (.20 cal) pneumatic rifles. The Sheridan "38" Targetrap is a dandy, weighs 34 pounds, has a large 18 x 12½" front. sells for $26.50. It's ideal for .38 revolver or .22 rifle shooting. Two or more can be bolted together for clubs or ranges. They have a flat base, a carrying handle and a wall hanger, so they can be used anywhere. Shooters who do not own a good bullet trap are missing a lot of good shooting fun and practice. Sheridan also makes a real lightweight $9.50 "Dual-Purpose Targetrap" weighing 8½ pounds, with a 10 x 6½" front. It stops .22 bullets.

LETTERS

APPROVES EDITORIAL POLICY

Dear Phil:

I feel impelled to add a word to the rather violent hassle over the de Haas article on barrels because if, as Mr. Robinson suggests (in August issue), Precision Shooting should delete all critical **opinions** we would lose a forum of great value.

As a result of this article we have had Mr. Fullmer's excellent and reasoned rebuttal from which I, and I am sure many others, gained new knowledge. In addition Mr. Robinson has had an opportunity to emphasize the merits of Micro-groove rifling more forcefully than would be possible in a paid advertisement. My own reaction is that I would like to own a Marlin .222 and may do just that if the piggy bank starts to run over.

I should add that my reaction would be different if the subscribers to Precision SHOOTING were not predominately expert riflemen—"thinking men who think for themselves"—who can properly assess the merits of opinion and criticism. And perhaps the entire barrel discussion will emphasize the need to keep critical opinion objective.

Cordially,
Bill (P. J. Purcell)
Schenectady, N. Y.

INFORMATION IMMEDIATELY USEFUL

Dear Mr. Teachout:

Your excellent little paper has always been of great interest and of value as guidance upon various shooting gadgets but one little article last month really came at the right time—"Tightening Receiver Sights" by J. M. Grigg.

It so happened that on the last practice night before leaving for our Canadian Nations at Connaught Ranges, Ottawa, my wife mentioned that the bar of her Parker-Hale sight on a 52 Standard was loose.

On the drive home I remembered reading over that article in the July issue which had just reached us. After re-reading the article the job was done in a few minutes, and a good job. Please give my thanks to Mr. Grigg for a most thoughtful article. In my opinion, articles such as this one render a great service to the game and our thanks are due to those who give their time to share their experience.

The articles on barrels by the top men are also extremely interesting and we really owe these men a vote of hearty thanks.

Sincerely,
W. V. Thompson
Toronto, Ontario

HANDLOADING DOPE AND CAUTIONS

Dear Phil:

Guess I owe you a letter, maybe two of them, so here goes. I get some of the darndest inquiries in some of my correspondence. Recently some young squirt wrote in to find out where he might get a new barrel in .308 cal. chambered for the Krag case, and fitted to an old Ballard action he had acquired. I had to tell him I would advise him to look for a stronger action than the Ballard for this case, otherwise his first shot might be his LAST, with this weak action.

The country thas gone mad on reloading, evidently, as most of the enquiries are about reloading, for this or that case. These come from young shooters evidently, who should first of all obtain the several manuals available on reloading before they even start to roll their own. Guess that is what is wrong with the RISING generation; they are rising too dog-gone fast for their own good.

Speaking of manuals, I read in one recently where the .219 Don. case gave some gosh awful PRESSURE. This was news to me. I'll be the first to admit one can get pressure if he loads my case full up with 2400 powder, but one

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2. National Small Bore Championship, Camp Perry, Ohio, 1957, John Moschkau.
3. 300 Meter Aggregate score, Du Bois, Pa., 1957, Don Robbins.
4. First and Second places, 300 meters, Du Bois, Pa., 1957, Clair Taylor and Don Robbins.
5. National Match Course, Du Bois, Pa., 1957, 1st, 3rd, 6th, 7th places.
6. National Match 10-shot 100 yd. aggregate, Augusta, O. Al Creighton, .3105".
7. National Bench Rest Championship, Johnstown, New York, 1955, Sam Clark, Jr.
8. 10 Shot 200 yard WORLD RECORD, Du Bois, Pa., 1954, Sam Clark, Jr. Score, or Group, .5276"
9. 10 Shot 200 yard WORLD RECORD, Du Bois, Pa., 1956, H. L. Culver (Present record) Group size .4016"
10. 1000 Yard, Famous Wimbledon match, any sight, 1955, Camp Perry, O. Frank Conway.
11. 1000 Yard, Famous Wimbledon match, any sight, 1956, Camp Perry, O. Frank Conway.*
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who would do that would look for a leak in a gas tank with a lighted match, so what?? In all the experimenting with this case I never had any trouble from pressure. My old friend March Prescott gave me a fired case from his own .219 Don. rifle that had been fired and then reloaded over 400 times. Can you do that with a Swift case??? One of my early rifles in this caliber was made up on a Krag action, which as you know will not stand much over 40,000 lbs. pressure. ALL OF WHICH goes to show some of the data that gets in print these days in the several MANUALS on reloading, now in circulation.

In recent years I have noticed there is a commodity known as common sense that is sadly missed and lacking in most articles on reloading. Now a lack of common sense shows a lack of experience, as well, so when both are missing I sometimes wonder just how far a young shooter will get with his experimenting in reloading ammunition.

One of the first things a shooter should learn is to select the PROPER powder for the case he wishes to reload. I have seen shooters spend considerable time in weighing powder charges to within a tenth of a grain, and lose sight of the fact they had not picked out the proper kind of powder to use with the bullets they expected to use. It is hard to account for this. There is always one particular powder that will give best results with a particular WEIGHT of bullet, and until the reloader learns the burning rate and other characteristics of a certain powder, he had better go slow in his reloading operations, says I. Another thing to remember, and that is to NEVER copy as to the amount of any powder charge, shown in print, without doing some experimenting with a smaller charge, and then working up to it gradually. There may be conditions in the barrel used in the test of the original loads, unknown to those who would COPY the load. This might be in groove diameter, number of grooves, twist, etc., all of which have a DIRECT bearing on pressure.

Just as an instance of this I will give you the results of some testing I have done recently with a rifle in 7 m/m cal. When the first rifles in this caliber came out, back in the eighties, the smokeless powder then in use was poor stuff so they used a twist of 7½ to 8 inches with the long 175 grain bullets. Now, the standard twist used is usually one turn in ten inches. The rifle I was testing had only four grooves and the twelve inch twist. This condition, in itself, indicated I could use a larger load than one a person would use in a rifle having six grooves and a ten inch twist. Plenty grooves and a quick twist sure jacks the pressure.

The bullets I selected for testing were in weights of 120 Gr., 139 gr., 154 gr. and 175 gr. Now as to powder selection. For the 120 gr. we use 3031 which is best for the high speed with this light bullet. The 139 gr. calls for 4320 powder, the 154 gr. should use 4064 powder, and the 175 gr. #4350. I have a good and sufficient reason for these selections, but it would take too long to go into all this matter in a letter. So, lets just say my own loading experience which covers over sixty five years is what I'm falling back on, in this instance.

My data tells me that 45 grs. of 3031 is right for the 120 gr. bullet, in this

(Continued on Page Eighteen)

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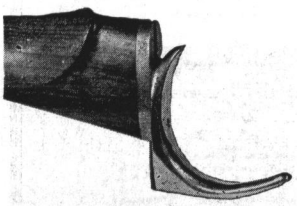

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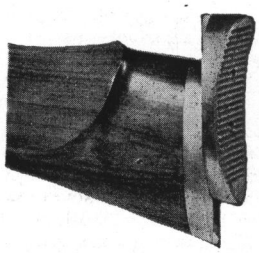

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(Continued from Page Seventeen)

particular rifle having a slower twist in 7 m/m caliber. So I set my old Ideal powder measure to throw 45 grs. of 3031. Next, without any change in the powder measure, I find it throws 48 grs. of 4320, which is correct for the 139 gr. bullet. Next, without any change in measure setting, I put in 4064 powder and find the weight thrown is 45 grs., which is correct for the 154 gr. bullet. Then, at last, I fill the measure with 4350 and find the weight thrown is 47 grs., which is correct for the 175 gr. You can try this on your own measure and see how it works out. (Editor's note: Having those four powders, plus four others, on hand, I did try it and checked within a half grain on all four charges with one measure setting.)

Now, the first thing you will notice is that the measure was never changed from the original setting, so the same BULK of powder was used in each loading. As simple as that. This is a system I have used for years and, believe me, it works. I have tried most everything you could imagine in this reloading business, and find the simplier you do it, the better are the results. Some shooters may think I am nuts, but the accuracy I get might change their minds. In case you are interested the over all of the 120 gr. load is 2⅞"; the 139 gr. is 3"; the 154 gr. is 2 15/16" and the 175 Gr. is 3 1/16". The first load is for chuck hunting, the second load for long range varmint hunting, and the last two loads are for deer hunting in woods hunting, with plenty of timber. (Editor's note: Remember that over-all accuracy and the occasional extremely small group from any rifle are horses of two entirely different colors.)

I use my own formula of GRAPHITE WADS in all my reloading operations, regardless of caliber, and find that it does add to the barrel life, as well as in preventing erosion at the throat.

The first .219 Don. ever made up, my own fine single shot Winchester, after something like 12,000 rounds, will still group on a dime at 100 yards and the barrel is in good shape. Every shot fired in this rifle was used with graphite wads. These graphite wads also work out very well in both the .357 and .44 S & W Magnum cases, where the shooter has had trouble with the barrel leading up.

Some time ago I saw an inquiry in the AMERICAN RIFLEMAN where a fellow was looking for a powder that he could load with safety in cases like the 32/40, 38/55 and 45/70. He had wondered if the bulk shotgun smokeless powder could be used. This powder will work out OK in the old black powder cases. I have used plenty of it in my own reloading, even going so far as to SCREEN the powder so as to have control over the SIZE of grains, used in the load.

I just wonder how many shooters know that if they will use a booster charge of say 4759 powder in the base of the case and then fill the case up to the base of the bullet with black powder they will get perfect results. Both the cases and the barrel will be clean as a whistle, with such a load, and pressure is normal. The booster charge will change the burning rate of the black powder, but best of all it will remove all the dirt and residue, which we have come to associate with the use of black powder. This same method was used over fifty years ago, with the

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white shotgun powder as a booster charge, but as a great many of the present day shooters were not around at that time I thought possibly some one who loves to shoot the old time guns might be interested in this information.

As the saying goes, I could WRITE A BOOK on this old time stuff, but if I did that it might interfere with my regular experimenting and shooting. When the time comes that I will have to give up shooting, that will be time enough to write about it.

Sincerely,
H. A. Donaldson
Fultonville, New York

L. L. F. Bullet Swaging Dies

(Continued from Page Nine)

same manner as I did before core seating.

The original core seating die received turned out core-seated jackets that measured .228″ O. D. and they were reduced to .224″ O. D. in the swaging die. This rather severe swaging resulted in a somewhat hard ejecting of the formed bullet, with the hollow-point noses frequently more or less mutilated by the ejection pin, and a not infrequent case of the pin going through the point into the core and a resulting stuck bullet—no great calamity but rather a nuisance. Bullets made with the die originally received had a good flat base but instead of a base with any bevel on the edge, there was a very slight "skirt" around the circumference of the base. This was apparently due to a swaging punch that did not fit quite snugly enough in the swaging die bore. The bullets are concentric, with no "pressure ring" at the base, a very uniform .224″ diam. for about ⅛″ up from the base and a very slight taper from there to start of the ogive. In spite of what appeared as defects of nose and base, the bullets shot better than I expected they would—more on this later.

Being "sold" on the E. U. (expanding up) system of bullet making, it seemed to me that core-seated jackets of .224″ diam., or slightly less, would swage more easily into better looking bullets that might give better accuracy than by swaging .228″ core seated jackets back to .224″. (I wrote Mr. Franssen at this point that I would like to try a core seating die of not over .224″. Instead of sending just the core seating die, he sent a complete set of dies, with the core seating die going just slightly less than .224″ and the swaging die making .224″ bullets. The bullets do swage easier, eject easier without deforming the hollow points, the swaging punch fits the swage bore snugly and bullet bases are good, with a slightly beveled edge—very good looking bullets.

The core seater punch with the first set of dies fits Sierra .705″ jackets and all Kampen jackets. The core seater punch with the second set fits the R. C. B. S. jackets but is too large for the Sierra and Kampen jackets. In ordering any bullet swaging dies it is necessary to advise the maker of the dies of the make and length of jackets you intend to use, and in some cases, the weight bullet you wish to make in a specified jacket length.

The proof of bullets is their average accuracy. Hereafter I will refer to bullets made by swaging from .228″ down to .224″ as "hard" swaged and those made in the second set of dies as "soft" swaged. Nearly all my test shooting has been at 100 yards, bench rest. At 100 yards I could not clearly determine any marked difference in accuracy between the "hard" and "soft" swaged bullets, in spite of apparent defects of the "hard" bullets. Shooting "run-of-die" bullets without selection, both "hard" and "soft," the average comparison of accuracy is:

The .219 Don. that I have used in competition this season has averaged for 20 10-shot groups in four tournaments with bullets from B&A dies, .607. Average for ten 10-shot groups with L. L. F. is .768. In another .219 Don., not good enough for competition but a reliable, consistent gun, average for six 10-shot groups with bullets from B&A dies was 1.015″ and for seventeen 10-shot groups with L. L. F. bullets 1.104″. In a heavy .220 Swift bench gun, one 10-shot check group with B&A bullets was .780″ and average for four 10-shot groups with L. L. F. bullets was .860″. In a .222 rifle the average with L. L. F. bullets was only slightly greater than for best other bullets used in it.

Just before writing this report I selected "soft" swaged bullets for uniform base appearance and loaded 40 rounds with 28 grs. 4064. Shot them at 200 yards in comparison with run-of-die "hard" swaged bullets loaded with 26.5 grs. 3031 (point of impact of the two loads is the same). Shot from portable bench and used a 10X 1¼″ Unertl scope with crosshairs. Rifle was the "not competitive" .219 Don. Light was dull overcast and wind variable 5 to 10 m.p.h. from 3 o'clock, which I held off for as best I could. Groups with "soft" swaged bullets were 1.535″, 1.620″, 1.820″ and 2.00″. With "hard" swaged bullets the groups were 2.28″, 2.10″ and 2.20″. Shooting was in my ordinary target shooting cadence of approximately two shots per minute. The rifle was not cleaned during this firing.

The bullets I have made to date in L. L. F. dies have not been quite good enough for bench rest competition, but I sure wouldn't blame the L. L. F. bullets for any misses on crow or larger targets at up to 200 yards. I think I can make better bullets in these dies than I have yet done. At the $40.00 price tag, I consider these die sets a very good value for the shooter who wants to make his own bullets but who does not require the brand of accuracy necessary for today's top bench rest competition—which demands THE BEST without regard to cost.

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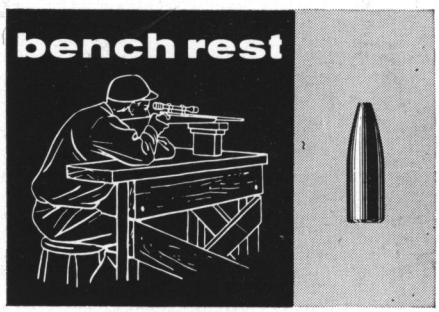

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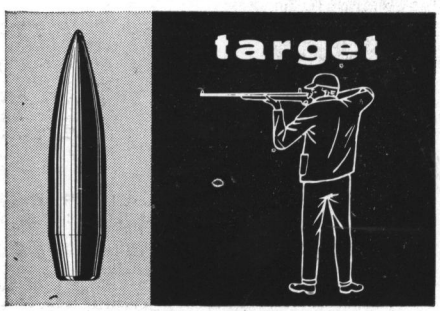

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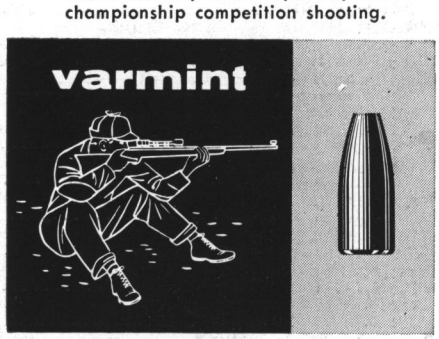

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